Gas Journal

DECEMBER 29, 1937

Vol. 220 89th Year No. 3893

1937

ONCE again that stage has been reached at which it is customary to pause and glance backward for the purpose of taking stock of the position; to sum up the events of the twelve-monthly period that is drawing to a close; and, in some measure, to give expression to one's views thereon. The year 1937 has been one which would be even more difficult than usual to sum up in a single word. "Good" would not adequately describe it, while there would be still less reason to dub it "bad" without any qualification. It has had its high lights, many of them; but at the same time the sky has been very far from cloudless.

There must, indeed, be quite a number of people who, apart from the reflection that another milestone has been reached in the passing of the years, will bid farewell to 1937 without regret. Nowadays changes are as rapid, and as momentous, as they are hard to foresee; and a feeling of uncertainty, tinged with some fear of the unknown, acts as a restraining influence. Spain remains in the throes of civil strife, with all its dangers to other countries; while now in the Far East there has arisen a desperate struggle fraught with even greater risks of extended conflagration. In other parts more or less frequent "incidents" have been reported, and following in their wake come "scares" which often have power to alarm until dispersed. With so many distractions abroad, it is only natural that uneasiness should spread itself at home. Fortunate it is that all these events have been happening during a time of great prosperity for this country; it would be difficult to suggest what might have been the effects under less favourable circumstances. Even as it is, side by side with industrial activity, high levels of employment, and cheap money, we have been experiencing what has been termed almost a major slump in the stock markets.

The Gas Industry

So far as our own particular Industry is concerned, the departing year, of course, has been a good one, and, in the absence of any untoward happenings, there is every reason to anticipate at least equally satisfactory things from 1938. Manufacturing operations are still very brisk, and the workers engaged in them, who utilize gas also to an enormous extent in their private lives, have more money to spend. A recent estimate placed the wages of manual labour in this country at £1,333,000,000 for 1932, and at least £1,700,000,000 for 1936-37. This increase, it should be noted, did not include salaried employees, such as clerks, &c. With the exception of the strike of omnibus employees round about the time of the Coronation, there has been a marked scarcity of major labour disputes—another satisfactory feature. Statistics for 1937 are not yet available, of course; but they should follow the lines of those for 1936, which was not only a year of records, but one showing a substantially accelerated rate of progress—with sales of gas up nearly 5%, it will be remembered, and a gain of 2½% in the total number of consumers.

At a similar rate of progress, the total number of gas consumers by the close of 1937 will have topped the 11 million mark, and but for another consideration which, particularly during the last few weeks, has loomed large in the public eye, we should certainly have gone on hoping for increases on a like scale for many years to come. But the birthrate is falling, and, unless something can be done about it, this is bound in course of time—and sooner rather than later—to have a prejudicial effect upon the Gas Industry, as well as upon all other manufacturers of commodities for home consumption. Just what can be done, within the range of practical politics, we are not prepared to say—and, as it would be absurd to urge people to have more children merely in order that there might be more gas consumers, there would be no need for us to indicate the steps that should be taken, even if we were in a position to do so. We would emphasize that the difficulty is to know what can be done; adequate reasons for the decline must be fairly obvious to most people, in spite of the need felt by the Government for a Population Statistics Bill, to permit of enquiries being made throughout the country by means of a questionnaire.

Changed conditions of life account for much, but the long-continued squeezing of John Citizen must account for a great deal more. Even a Government must come up against a time when they cannot have things every way, and we are quite sure that an income-tax (besides the other levies) on the scale of that now weighing upon this country is incompatible with large families of the right kind of children. Does it really need an Act of Parliament, and possibly a fresh crowd of officials, to make this clear to Ministers, or at any rate to the parties responsible for the framing of a Bill to which the familiar title of the "Nosey Parker" Bill has been applied? There will be a further restrictive influence in the levying of the National Defence Contribution which was decided upon at the time of this year's Budget.

We must, of course, be prepared for war, if we are to experience the blessings of peace, and perhaps, in the circumstances that have presented themselves, it has been impossible to avoid the other onerous taxation imposed—at times, one has felt, all too light-heartedly. But, admitting all this, do let us face-up to the fact that, in addition to the burden thus thrust upon the individual, a consequential penalty will naturally fall upon the Gas Indus-

try, and upon the country as a whole, in the form of a falling rate of increase in the number of consumers of gas and other commodities. It is to be feared that to say "a falling rate of increase" is to place the matter in the most favourable light. There is therefore every need for the best efforts on the part of all of us, to maintain trade and industry at the present high level, for any appreciable slackening-off can only accentuate the unfortunate tendency which has given rise to the Population Statistics Bill. And, even after giving due weight to seasonal influences, the November labour statistics were none too reassuring.

National Gas Council

The National Gas Council has now completed its first year in its new Headquarters at Gas Industry House. The building was formally opened on Feb. 19 by the Rt. Hon. Walter Runciman, M.P., at that time President of the Board of Trade, and by reason of its ample accommodation and unrivalled situation it has already proved of inestimable value to the Industry.

The year has also been marked by an unprecedented growth in the work of the Council, and in a brief review of its activities it is possible only to mention some of the principal features, many of which have received detailed attention in the columns of the "JOURNAL" during the year.

One of the most important events of the year directly affecting the Gas Industry was the Inquiry by a Joint Committee of both Houses of Parliament into the operation of the basic price principle. The question arose out of the controversy concerning a tariff suggested by the South Metropolitan Gas Company, but the terms of reference to the Committee were such as to permit of a review of the basic price system throughout the Industry. Certain proposals were placed before the Joint Committee by the London County Council, of which the most important was that a tribunal should be set up with power to review the prices to be charged to ordinary consumers.

The Inquiry occupied twelve days, during which evidence was given on behalf of the National Gas Council by Sir David Milne-Watson, Bart., and Mr. T. P. Ridley. Both these witnesses emphasized the fact that the proposal put forward by the London County Council that a Gas Prices Tribunal should be appointed by the Board of Trade could not be accepted on behalf of the Industry. The Report of the Joint Committee was issued on April 21, and contained recommendations which were entirely satisfactory to the Industry. In the course of these the Joint Committee referred to the competition of the Gas Industry with electricity and oil, and advocated that Parliament should empower the Industry to enforce a minimum charge for gas. They also took the view that the force of public opinion constituted the best form of control in the event of any attempt being made to enforce prices which were unreasonable.

Legislative and Parliamentary

The Finance Bill, which was introduced in April, contained as usual several points of particular interest to gas undertakers. A novel feature of the Bill was the National Defence Contribution, from the operation of which the Council was successful in obtaining the complete exemption of all statutory gas undertakers. In addition, the Council was able to secure the incorporation in the Bill of provisions whereby Holding Companies are exempt from liability to the tax in so far as their incomes are derived from their holdings in statutory public utility companies. The Bill also modified the law relating to income-tax allowances in respect of the depreciation of buildings. Certain important amendments of the Government's original proposals were secured, and an undertaking was obtained from the Inland Revenue that any grievances which might arise in practice would be amended by subsequent legislation.

The Council was associated with the Gas Companies' Protection Association in negotiating with the Inland Revenue on the subject of the amount of the allowances to be claimed by gas companies in respect of the depreciation of gas appliances, and evidence has been prepared and collated by the Council for the purpose of demonstrating that the existing allowances are inadequate.

The Council has also had under consideration income-tax questions relating to sums paid as compensation in the case of amalgamations, expenditure in providing public lighting and fittings, and other matters.

A considerable volume of work has also arisen in connection with rating assessments, and the Council has collected from the Industry further information which was desired by the Central Valuation Committee with regard to the assessment of hereditaments which extend into more than one rating area.

Difficulty has been experienced in many cases where Rating Authorities have attempted to revalue undertakers during the quinquennial period, and negotiations have been conducted with an important County Valuation Committee for the purpose of securing some agreement whereby any attempt to re-assess during the quinquennial period might be obviated.

Considerable difficulty has also arisen in connection with the assessment of undertakings for the purposes of the drainage rate under the Land Drainage Act, 1930. Negotiations are still in progress with the Catchment Boards' Association, as it is desirable to agree with the Catchment and Drainage Authorities some basis of assessment which will be universally applicable throughout the country.

During the summer, the four amalgamated Railway Companies made application to the Railway Rates Tribunal for an authorization of a rise of 5% in all railway rates and charges. The Council presented a case against any increase, but the position was complicated by reason of the fact that the Railways Act, 1921, provides that railway charges shall be so fixed as to provide to the Railway Companies a standard revenue. It was not, therefore, possible for the Tribunal to regard the matter from the point of view of the industrialist, and, provided that the Railway Companies could show that an increase in charges would result in some increase in revenue, the Tribunal had no option but to accede to their application.

At the beginning of the year the Government introduced as one of their major measures a comprehensive Factories Bill, and the Council took part in the prolonged negotiations with the Home Office which preceded the introduction of the Bill into Parliament. Considerable modification of the original proposals of the Government was secured, and in particular provisions were incorporated in the Bill to ensure that no Factory Inspector could make demands which were prejudicial to the use of gas in factories.

Another important Government measure was the Public Health (Drainage of Trade Premises) Act, 1937, which confers upon industrialists the right, subject to certain conditions to be formulated by by-law, to discharge trade effluent into sewers. The Council took part in the negotiations with the Ministry of Health in respect of this measure, which has been widely welcomed by industrialists. Model By-laws have since been drawn up by the Ministry of Health, and the Council are at present in negotiation with the Ministry in regard to their form.

The Conjoint Conference have continued to pursue their negotiations with the Central Associations of the Highway Authorities, with the object of securing an agreed clause relating to mains and cables in highways, and a considerable measure of agreement has been obtained upon this complicated matter. In this connection, a most useful protective clause was obtained and incorporated in the Staffordshire County Council Act, 1937, which will be of considerable assistance in the national negotiations.

During the year the question of precautions to be taken in the event of hostile air raids has been under the consideration of the Government, and although certain tentative suggestions were put forward as to what the Industry might do in this connection, it was impossible to extract from the Government any statement as to the measure of financial support which might be expected from the Treasury. In November, however, the Government introduced the Air-Raid Precautions Bill, which requires local authorities to submit to the Ministry schemes with

regard to air raid precautions. Considerable grants were to be made from the Treasury to local authorities in connection with such schemes, these grants being based upon the population of the area concerned. The Bill, however, does not apply to statutory companies, and the Home Secretary, who was in charge of the Bill in the House of Commons, was not able to do more than promise to make at an early date a statement which would define the position of public utility companies. Nevertheless, the Council was able to obtain the incorporation in the Bill of a provision exempting the lands of statutory public utility undertakers from the right of compulsory purchase which is to be conferred upon local authorities. It is satisfactory to be able to report that this exemption has been made applicable both to statutory and to non-statutory undertakers in Scotland.

An important Report was made by the Committee which was appointed to investigate the regulation of the gas equipment of domestic premises. The Report embodies a comprehensive and detailed set of regulations covering the whole subject, and these regulations have been accepted by The Institution of Gas Engineers. The demand for copies of the regulations was so great that the first edition was rapidly exhausted. As it is known that both the Board of Trade and the Ministry of Health view these regulations with favour, it is anticipated that they will eventually be adopted as the basis of by-laws throughout the country. The Committee is now occupied in revising the booklet in regard to the fixing of geysers published by The Institution of Gas Engineers in 1930.

It is also of interest to report that the action taken by the Council through the British Gas Federation led to the alteration by the Mint of a new threepenny coin which in the form originally proposed would have been capable of operating automatic meters in a manner prejudicial to the Industry.

The Committee appointed by the Ministries of Labour and Transport to examine the position in regard to the regulation of wages and conditions of service of persons employed in connection with the carriage of goods by road completed their deliberations in May, and issued a Report on the matter. The main question with which the Committee had to deal was whether the wages and conditions relating to drivers of " C " licence vehicles should be regulated in the same way as those of drivers of vehicles having an " A " or a " B " licence. Evidence was given before the Committee on behalf of the Gas Industry, and it is satisfactory to know that in their Report the Committee recommended that a " C " licence holder should be deemed to pay fair and proper wages if he observed the wages and conditions determined by a Joint Industrial Council. Since the issue of the Report, one or two minor matters have arisen, with regard to which further representations have been made to the Ministry.

The Coal Situation

The most difficult and important matter with which the National Gas Council has been confronted during the year is, of course, that relating to the coal industry. The centralized selling organizations which were authorized by the amending Coal Schemes passed in 1936 have been in operation throughout the year, with the result that competition has been eliminated in the coal industry, and undertakers who have been under the necessity of renewing their contracts have been faced with large increases in price. Against the monopoly vested in the hands of the coal owners, the coal consuming public have no adequate protection, and although the Government have replaced the original chairmen of the Committees of Investigation by impartial lawyers, no application which has been made by a public utility undertaking to a Committee of Investigation has been found to be satisfactory. Further, it has been found that, with the exception of one or two districts, the coal owners themselves have been unwilling to co-operate with the representatives of public utility organizations, and in particular have refused to enter into any discussion with regard to price.

In these circumstances, constructive proposals were placed before the Secretary for Mines by an influential deputation from the Conjoint Conference, representing all public utility undertakers throughout the country. The main proposal submitted to the Mines Department was that an independent Supervisory Body should be set up to supervise the industry in the interests of the consumers. In addition, the Mines Department were urged to introduce legislation to ensure that the proceedings of the Committees of Investigation should be held in public, and that a complainant to such a Committee should be given the right to obtain from the coal owners figures and other information necessary to establish his case. The Department rejected the suggestion of a Supervisory Body, and would give no definite assurance in regard to the other points raised, though certain vague promises were made as to the modification of the existing law relating to Committees of Investigation.

In November, however, the Government introduced as a major measure the Coal Mines Bill, in which some of the demands made by the Conjoint Conference were conceded. For instance, the legal Chairmen of the Committees of Investigation were given statutory power, and were enabled, in cases where other members of the Committee were not unanimous, themselves to give a binding and effective decision. Further, the Bill provides that in normal circumstances the Committees of Investigation should sit in public, and that facilities should be available whereby information could be obtained by persons desiring to present a case before them. In addition, a National Appeal Tribunal is to be set up to which an aggrieved person may appeal from the decision of any local Committee of Investigation.

Despite these concessions, however, it is felt that the major objection of large consumers of coal has not been met, in that the Government has not accepted the proposal that a Supervisory Body should be constituted with powers to supervise prices in the interests of the consumers. If the Bill passes into law in its present form, the Committees of Investigation will remain ineffectual, since they will still have no power to deal with any complaint with regard to a general increase in the price of coal; nor will they be able to grant relief to consumers who complain that they are the victims of an undue discrimination with regard to price.

The function of the Committees of Investigation will merely be to operate within the scope of the Coal Mines Act, which expressly authorizes price discrimination.

These serious defects of the Bill from the consumers' point of view were clearly pointed out by two Members during the course of the Second Reading Debate in the House of Commons, and the Council, in conjunction with the Conjoint Conference and others vitally concerned, will continue the onerous task, which has already involved very heavy work, of organizing opposition to the measure in its present form.

Many other matters of general interest affecting the Industry as a whole have come within the purview of the Council in the course of the year, and in addition they have had to deal with an unusually large number of questions relating to individual members. Information, advice, and assistance have been sought in regard to many diverse points of law and practice, and in every case endeavour has been made to meet—happily in most cases with success—the requirements of the applicant.

Amalgamation of Gas Undertakings

The past year has again been marked by considerable activity in this direction both by individual undertakings and holding companies. With the greater number of undertakings coming under control of holding companies, efforts to form geographical groups become increasingly clear. From what in the early stages of the movement frequently appeared to be little better than " drift," efforts to effect some measure of regional rationalization can now be discerned.

Dealing first with the " physical " amalgamations that have taken place, early in the year Newcastle-upon-Tyne and Gateshead Gas Company reached a provisional agreement with the South Shields Gas Company for the merging of the two undertakings, subject to ratification

by shareholders of both Companies and to the necessary statutory authority. Negotiations for the agreement had been proceeding since August, 1936, and their statutory endorsement will bring Tyneside's gas supply under one control, South Shields being the only town-gas producing concern operating independently of the Newcastle Company in the area. The merger received the approval of the shareholders of both Companies, and Newcastle made application to the Board of Trade for a Special Order. Objection, however, was lodged with the Board of Trade by the Town Councils of South Shields and Jarrow and the Urban Councils of Hebburn and Boldon, and this was the subject of an enquiry before the Director of Gas Administration. The Board of Trade, however, made the necessary Order.

During the year Sheffield Gas Company obtained a Special Order from the Board of Trade authorizing them to purchase Barnsley Gas Company. This Order was, however, held up in the House of Lords because it was opposed by Barnsley Corporation, who desired to acquire the Undertaking compulsorily and lodged a Bill in Parliament for that purpose. The matter went before a Select Committee of the House of Lords, a decision in favour of the Sheffield Company was given, and the Special Order confirmed. On the evidence presented the Committee were unanimous in their decision and did not think it necessary for Sir Walter Monckton, Counsel for the Company, to reply.

Later in the year an extraordinary meeting of Tottenham and District Gas Company approved an application to the Board of Trade for a Special Order to authorize the taking over of Southgate and District Gas Company. The amalgamation will take effect on Jan. 1. The shareholders received in return for each £100 7% stock, an equivalent of £140 in 5% stock, which gives the same dividend. Other "physical" amalgamations *seriatim* included the following. Loughborough Gas Department absorbed Quorndon and Mountsorrel Gas, Coke, and Coal Company, an offer from Leicester Corporation having been withdrawn on economic grounds. The necessary Order for this amalgamation has been made by the Board of Trade. Clevedon Gas Company obtained the necessary Special Order to acquire Yatton Gas Consumers' Company, Ltd. Preston obtained a controlling interest in Longridge Gas Company. Following the acquisition of Frodsham Gas and Water Company late in the previous year, Runcorn Gas Company applied for a Special Order with the object of altering the name of the Company, providing for the amalgamation and the dissolution of the Frodsham Undertaking, and for an extension of its area of supply. Both these undertakings are under the control of the United Kingdom Gas Corporation. The Board of Trade approved the draft of a Special Order under which the undertaking of Adlington Gas Company was to be transferred to Chorley Town Council, who, about the same time, approved a recommendation to acquire Blackrod Gas Company's undertaking. Belfast Gas Department absorbed Holywood Gas Company.

Pontypool Gas and Water Company obtained a Special Order, the purposes of which provide for the vesting in the Company of the undertakings of Blaenavon Gas and Water Company and Usk Gas Company and acquired Cwmbran and Pontnewydd Gas Company. The Northampton Gas Order, 1937, having been approved, Northampton Gas Company took over Newport Pagnell and Olney Gas Companies. Portsmouth and Gosport absorbed Hayling Island. After a year's negotiation, agreement was reached between Spalding U.D.C. and Holbeach Gas and Coke Company for the purchase by the Council of the Holbeach Undertaking, the agreement providing that unless the necessary Special Order empowering the amalgamation was obtained by June, 1938, the arrangement was binding to neither party. Among the objects of another Special Order for which Torquay and Paignton Gas Company are applying is one empowering the Company to purchase the undertaking of Totnes and Bridgetown Gas Light and Coke Company.

Two years' negotiations culminated in the fusion of the interests of Shanklin and Ventnor Gas Company and Sandown Gas and Coke Company, who now receive a bulk supply from Shanklin. The difficulty of finding a name for this amalgamation was solved by adopting an entirely new title, viz., East Wight Gas Company. A "physical" amalgamation of two undertakings within the South-Eastern Gas Corporation took place when Lydd amalgamated with New Romney, and within the South-Western Gas and Water Corporation when Beaminster was merged with Crewkerne and Ottery St. Mary with Seaton. Coatbridge have made an offer for the undertaking of Airdrie Corporation, and, subject to the approval of the Town Clerk, St. Helens Corporation are taking over the undertaking of Rainford Gas Company.

Holding Companies' Activities

There has been considerable activity among holding companies and control of a large number of undertakings has been acquired. Associated Gas and Water Undertakings, Ltd., the majority of whose undertakings were situated in the contiguous counties of Kent, Sussex, Surrey, Hampshire, and Buckinghamshire, have broken new ground by acquiring Ilfracombe and Barnstaple, the latter having been acquired from South-West Utilities, Ltd., who are now temporarily without control of any undertaking. Another acquisition was Burgess Hill and St. John's Common, Sussex, bringing the total number controlled up to seventeen.

Associated Utilities, Ltd., in addition to Basingstoke, now hold Kingsclere, Hampshire, and Reading, Berkshire. The British Gas Light Company, Ltd., the pioneers of the holding company movement, acquired control of Chatteris, Cambridgeshire. Gas Consolidation, Ltd., who already controlled five Staffordshire undertakings, have taken over Stone and Uttoxeter, both of that County. This Corporation controls the Palatine Gas Corporation, Ltd., from which it has taken over Mossley and Saddleworth—leaving to the Palatine only one works—viz., Ashton.

The Severn Valley Gas Corporation, Ltd., continues to develop geographically on the lines indicated by its title. The number of the companies controlled has been increased by four, bringing the total up to twenty-four. The year's acquisitions included Caldicot and District and Monmouth, both of Monmouthshire, and the undertaking of Winsford U.D.C., Cheshire. It will be recalled that one of the last acts of the Winsford Council on behalf of its gas undertaking was to apply to the Board of Trade for a Special Order with the object, among others, of extending existing limits of supply. Application was unsuccessfully opposed by local electricity interests on the unusual grounds that the expansion of the gas undertaking would cut into their business and so reduce their margin of profit. The Corporation also acquired Leominster, Herefordshire.

Important acquisitions have marked the year's work of the South-Eastern Gas Corporation, Ltd., four Companies having been acquired—viz., North Middlesex, Slough, Buckinghamshire, Tenterden and District, Kent, and Windsor, Berkshire. The number of undertakings controlled by the Corporation is now twenty-eight. The South-Western Gas and Water Corporation, Ltd., acquired Wells, Somerset, and General Engineering and Construction Company, Ltd., Dorchester. South-West Utilities, Ltd., parted with their one acquisition, Barnstaple, to Associated Gas and Water Undertakings as already mentioned.

Stellite, Ltd., the low-temperature carbonization concern, of Queens Ferry, near Chester, made an offer to Llandudno Council for the purchase of their gas undertaking, which offer it is proposed to accept on certain conditions. Swindon and District Gas Corporation, Ltd., has added Cirencester, Gloucester, to the number of undertakings consolidated in the neighbourhood of the parent company, Swindon United Gas Company.

Sixteen Companies were taken over during the year by the United Kingdom Gas Corporation, Ltd. Acquisitions in the Manchester area were added to by the acquisition of Broadbottom, Denton U.D.C.'s gas-works, and the Radcliffe and Little Lever Joint Gas Board. In Yorkshire, Hornsea, Kippax and District, Normanton, Pudsey, and Sherburn and South Milford were acquired. In Cheshire, control was obtained of the undertakings of Dukinfield Corporation and Northwich Gas Company. In Lancashire,

Farnworth and Kearsley and Leyland were acquired. In Bedfordshire, Bedford and Leighton Buzzard were added to the Corporation's long list. In Wales, where the Corporation already controlled four undertakings, Aberdare and Aberaman has been acquired, and in Oxfordshire Thame.

A newcomer to the grouping movement is the Cambrian Gas Corporation, Ltd., which was registered on Oct. 22 as a public company with a nominal capital of £200,000. It was formed to acquire and develop public utility undertakings principally in Wales. The registered offices are at Stellite Works, Queens Ferry, near Chester. The whole of the share capital of the following Companies has been acquired: Connah's Quay, Mold, Hawarden, and Conway. We understand that offers to purchase other undertakings are under consideration.

The Institution

The year that is closing has been marked by events of outstanding importance both to the Nation, in the Coronation of Their Majesties King George VI. and Queen Elizabeth, at which the Institution was represented in Westminster Abbey by its President, Mr. Stephen Lacey, and to the Institution, in the allowance by the Lords of the Privy Council of certain amendments to the by-laws. Broadly, the effect of these amendments is to widen the doors of entry to Corporate Membership by making eligible, subject to compliance with the already existing by-laws, members of the coke oven and low-temperature carbonization industries and by allowing, as part qualification for Membership and Associate Membership, certain Degrees and Examinations other than those in Gas Engineering proper. It is hoped that advantage will be taken of these facilities for broadening the technical basis of the Institution.

Further revisions have also been made in connection with the Education Regulations, with particular reference to the Supply side of the Gas Industry, by the initiation of a Higher Grade Certificate in Gas Engineering (Supply), ranking as part qualification for Corporate Membership of the Institution, and of a Certificate in Gas Supply.

In the sphere of research notable progress is also to be recorded. The Research Executive Committee has turned its attention away from *ad hoc* problems, such as corrosion and the examination of existing gas manufacturing processes, to research of a fundamental nature. An investigation of fundamental reactions involved in the production of high-grade town gas by gasification under pressure with oxygen and steam has already yielded important results, and close contact is being maintained, through a Joint Committee, with the Fuel Research Board in connection with this work. A complementary investigation has been initiated of the influence of various combustion characteristics of gas upon the performance of gas burners, a subject which has a vital bearing on the flexibility of gas manufacturing processes.

The practical investigations of the Liquor Effluents and Ammonia Committee have been terminated for the present with the completion of an examination of a full-scale plant for the manufacture of concentrated liquor, a process which is finding increasing favour with gas engineers as a preferable alternative to the running to waste of gas liquors.

Contact and collaboration with other research organizations is being extended; for example, the Institution is collaborating with other interested organizations in an investigation of the fundamental principals of furnace design, a subject on which there is at present a serious lack of information.

The 74th Annual General Meeting held on June 1 to 4 brought a record attendance of 1,632, including a number of overseas members and visitors. The business sessions were held this year for the first time in the Hall of the Royal Geographical Society, and the six Papers presented and discussed constituted an exceptionally well balanced and comprehensive programme of subjects of marked topical interest.

The following Medals for 1936 were presented at the Meeting: The Institution Gold Medal to Mr. H. Hollings; the H. E. Jones London Medal to Mr. James Jamieson and Dr. J. G. King; the Institution Silver Medal to Mr. C. A. Deas; and the Institution Bronze Medal to Mr. C. Fuller Petersen.

The Reception and Dance at Grosvenor House, at which the attendance was approximately 1,000, was a distinguished and enjoyable function. At the termination of the Annual General Meeting Mr. Harold C. Smith (London) assumed the Presidency and Mr. George Dixon (Nottingham) took office as Vice-President, the Senior Vice-President being Mr. Robert Robertson (Bristol).

The 9th Autumn Research Meeting, held on Nov. 2 and 3, was well attended throughout, and the number of those wishing to take part in the discussions was evidence of the practical interest of the subjects dealt with. Particular attention was focused on a series of three Papers upon methods of reducing the content of sulphur compounds in gas to well below 10 grains per 100 cu.ft., and it was emphasized that such methods are now generally available to the Gas Industry. The Institution was pleased to welcome at this Meeting its newly-elected Honorary Member, Sir Harold Hartley, F.R.S., who stressed the importance to the Industry of fundamental research.

The Institution has continued to participate in the work of the International Gas Union, one of the Committees of which has as its Chairman Mr. C. Valon Bennett (Rochester), a Past-President of the Institution. The 3rd International Gas Conference of the Union was held in Paris on June 12-16 and was attended by a British Delegation of 63 gas engineers and their ladies, led by Mr. Harold C. Smith and organized by the Secretary. Two Papers, by Mr. H. C. Widlake on "Electrolytic Corrosion of Gas Mains" and Mr. R. N. LeFevre on "Technical Service for Gas Consumers," sponsored by the Institution, were presented and discussed at the Conference.

At the 9th Public Works, Roads, and Transport Congress an Exhibition and afternoon Session was, as on previous occasions, organized by the Institution, and two Papers, by Mr. H. R. Hems on "Industrial Gas" and by Mr. W. J. Hadfield on "Road Tar," were presented and discussed. The attendance was exceptionally good and the collaboration of the British Road Tar Association in this Session was much appreciated.

The membership of the Institution continues to increase, and has now reached 1,681. The Benevolent Fund has benefited this year by contributions in response to a special Coronation appeal to members and further by a considerable sum presented by an anonymous donor. Further increased contributions are, however, required to enable adequate assistance to be given to the many deserving cases that are brought to the notice of the Committee of Management.

The former Secretary of the Institution, Mr. J. R. W. Alexander, resigned the Secretaryship at the end of June on taking up managerial appointments within the Gas Industry. The appreciation by members of his services to the Institution since his appointment as Secretary in 1929 was marked by a presentation to him at the 9th Autumn Research Meeting of silver, together with a bound list of subscribers thereto. In his place the Council appointed to the Secretaryship Dr. W. T. K. Braunholtz, Technical Assistant Secretary of the Institution since Jan. 1, 1935.

The B.C.G.A.

The Annual Conference of the Association is always a good guide to the trend that its work, backed up by the general opinion of its members, is taking. At Manchester this autumn the papers delivered to the Twenty-Sixth Annual Conference were in a very real sense an attempt to lay down a firm foundation for a common sales policy. Colonel W. M. Carr, in an Address on "Planned Selling," and Mr. S. C. Leslie, in a Paper on Kensal House, had some stimulating suggestions to make towards a genuine forward policy for propaganda and sales, suggestions supported by the discussions on these Papers. As Mr. R. W. Lowman pointed out, the same series of Press advertisements, the same posters, showroom displays, and sales literature and, if possible, the same price appeal over an area unquestionably will produce results which can never be achieved by undertakings advertising locally and on diverse lines. "The B.C.G.A.," said Colonel Carr on the same occasion, "is making history in the new gas fire

campaign, in which we are to have one price, and one price only."

The campaigns referred to by these gentlemen were another step towards a national marketing policy within the Industry. They started with a national Gas Cookery Week early in 1937, and results fully justified the experiment. Advertisements, literature, window displays, and editorial matter, all telling the same story, were made available to the Association's members, and many undertakings reported excellent results. In one instance the cooker sales in a large town were 130% higher than in the corresponding week the previous year.

Gas Cookery Week was followed by a Gas Hot Water Week, in which the keynote was "Down with Drudgery," and the Gas Fire Fortnight mentioned by Colonel Carr. The slogan for this was "Nice Houses for Ice Houses."

These special selling campaigns allowed undertakings' local sales campaigns to draw strength from the national appeal in a more direct way than was possible before. Undertakings by supporting the B.C.G.A. campaigns added considerable strength and appeal to their own sales drives, while the note of urgency introduced by the time limit for each campaign spurred salesmen on to special efforts and at the same time stimulated hesitant customers to come to a favourable decision. An interesting feature of these campaigns was the introduction of radio advertising. A common price appeal was also the basis of a spring and summer refrigeration campaign which was carried on in the national and district newspapers and in the magazine Press.

Apart from these special campaigns, the B.C.G.A.'s educative advertising was continued with the object of building up a large body of opinion receptive to direct selling campaigns; while in the technical Press the services of the Gas Industry to industrial and commercial concerns were exemplified by a series of advertisements illustrating and describing actual installations. In the architectural Press an excellent beginning was made with a series of gas information sheets in the production of which the makers of equipment co-operated.

In its sales literature the Association has been quick to take advantage of any opportunity towards integration of other sides of its publicity work with its established schemes. As an instance, there is this year's documentary film, "Children at School," which was supported by two issues of "A Thousand and One Uses for Gas" dealing with school and college planning and its relationship to gas. These booklets give undertakings effective and concrete sales follow-ups to any film-showing in their areas.

From the many other pieces of publicity material produced by the Association during the year may be mentioned one or two outstanding examples. "Lighting on the Roads" convincingly tied-up the recommendations of the Ministry of Transport's Committee on Street Lighting with the use of gas for this purpose; it should do much to make the members of local authorities ready to consider the claims of gas lighting. An issue of "A Thousand and One Uses for Gas" also dealt with street lighting, while other numbers covered floodlighting, hospital kitchen equipment, and exterior shop lighting; an interesting "prestige" story for gas was contained in an issue dealing with the cooking and kitchen water heating arrangements at the new Earl's Court.

The 1937 gas films had a good Press and should repeat the excellent work of their forerunners. The development of this side of the Association's activities has been strengthened by the appointment of a film officer with considerable technical experience. Mr. Baird will be available to advise undertakings on the most effective ways of utilizing the films and to widen the scope of suitable audiences.

The B.C.G.A.'s educational schemes for the training of salesmen were inaugurated six years ago. The paramount thought behind their inception was, no matter how efficient an undertaking's service organization and advertising methods may be, it must rest always with the sales staff to consummate those activities. Over 2,000 students have been enrolled since the inception of the scheme, but, after six years, much of the information in the seven handbooks issued for the salesmanship course has naturally become out-of-date. The Association's sub-Committee which deals with this one of its activities has therefore revised the course in the light of the experience gained. The handbooks for students' use have been reprinted in an entirely revised form with new diagrams, charts, &c.

The sub-Committee at the same time took the opportunity to consider the qualifications of salesmen under the scheme, with the result that an oral examination for each candidate has been added to the existing tests on the handbooks and the written examination. It was also felt that there was too much inclination on the part of students, once the course had been taken, to treat its precepts as theories instead of principles for practical application. The course is only the beginning of sales training, giving the student an outline of procedure and principles to be followed to achieve top-line selling; for the Industry to benefit as it should from the course, salesmen should constantly put into practice the principles learnt. The sub-Committee recommended therefore that Domestic Gas Salesmanship Course Discussion Groups should be formed to meet and discuss pre-selected problems under group leaders. Leaders' guides, tying-up with the course, will be issued. The Association's Executive Committee has adopted this recommendation and is also considering the substitution, for that part of the course dealing with the economics of gas supply, of a course covering subjects more closely connected with salesmanship, such as advertising, marketing, exhibitions, and the like.

Another move towards the education of the salesman is the public speaking competition, the first of which was held last year. This is open to the members of Gas Salesmen's Circles and a gold medal is awarded annually to the winning entrant.

The B.C.G.A. Studio has had a very busy year. Over 100 undertakings were supplied with regular monthly display materials, posters, and so forth, and a large number of special window displays have been ordered. Display material was produced to link up with the special selling campaigns of the Association, and for the Coronation and a number of exhibitions. One large increase in the Studio's activities has been in the production of Christmas displays, the volume of business having increased 300% on last year.

The sub-Committee mentioned above is one of the various small specialist committees set up by the Association last year for dealing with the various branches of B.C.G.A. work, a step which has had the advantages of bringing to bear on any problem the close attention of experienced sales organizers and publicity men, and making for a greater co-ordination of effort.

A review of the work of the B.C.G.A. would not be complete without a reference to the men who guided its activities last year. In its President, Councillor W. P. Jackson, J.P., Chairman of the Corporation of Manchester Gas Committee, the Association secured a distinguished and keen mind which brought great enthusiasm to bear on the work to be done; the Conference at Manchester was a tribute to Councillor Jackson's energy and personality. The Association was fortunate in its Chairman of the Executive Committee—the first to succeed Sir Francis Goodenough on his retirement. Mr. A. W. Smith, who held this position throughout the year, is a genuinely modest man where personal publicity is concerned; behind the scenes, however, he has devoted much time and hard work to the Association's service, and it must be a considerable satisfaction to him to know that during his year of office the membership of the Association has been materially increased.

During 1938 the position of Chairman will be held by Mr. W. J. Sandeman, General Manager, the Croydon Gas Company, whose sterling work for the Association in the past is a sufficient guarantee of his future services.

The S.B.G.I.

The Society of British Gas Industries has had an active year, under the Chairmanship during the early part of Mr. F. B. Richards, and since May of Mr. R. J. Rogers. Membership continues to increase, and the importance of contracting and manufacturing firms associating themselves officially with the corporate activities of the Indus-

try in this way will not be lost upon those who appreciate the strength which is derived from a united Industry.

The Society, moreover, is showing itself to be well alive to the need for widening the basis of representation on its Council. In 1936 a new Section was formed for the makers of Industrial Gas Equipment, and this has been followed in 1937 by the formation of three new Sections to cover respectively makers of Water Heaters, makers of Scientific Instruments, and builders of Coke Ovens. Since it is common knowledge that the Society is an entirely voluntary association, and that there can be no question of a majority coercing a minority, the advantages of individual enterprise and responsibility are retained and the more representative the structure of the Society, the greater are the possibilities for the other national organizations to seek its assistance in dealing with questions common to the whole Industry. It is interesting, for example, to place on record that during the year such a complicated question as the drafting of Regulations Governing the Installation of Gas Service Pipes, Gas Supply Pipes, and Gas Appliances was carried through by a Committee of the British Gas Federation representative of all interests with a celerity which might well be the envy of any other industry in the country. The same Committee, with the help of fully competent and representative sub-Committees, is now engaged in the preparation of regulations to cover the installation of water heaters of every description. These cases are but two typical examples of the directions in which an active organization, fully representative of contractors and manufacturers, can assist the Industry.

In reviewing the work of the Society during the past year reference may very appropriately be made to the question of public lighting, since the confidence of the makers of gas lighting units is meeting with an increasing response from the Industry as a whole. The subject is dealt with elsewhere in this Review, but, as regards the Society, we would put on record here the compliment which has been paid it of being asked to increase substantially its representation on the I.G.E. Joint Lighting Committee. It is, in fact, the considered opinion of all concerned that if full use is made of the resources available within the Industry the public lighting load can and should be maintained and extended.

At the Annual Meeting of the Society, held in May, its distinguished President, Lord Londonderry, delivered a most interesting Address, in which he drew upon his wide experience in the political, industrial, and social life of the country. At the dinner which followed the Meeting the Society was honoured by its health being proposed by Sir David Milne-Watson, Bart. Lord Londonderry has been succeeded in the office of President by a scientist whose activities are already well known and appreciated in the Industry, Sir Harold Hartley.

Mr. R. J. Rogers presented at the Autumn Meeting the Address which it is customary for the Chairman to give, and chose for his title "Co-operation and Service in the Gas Industry." It included a valuable chart, showing the national organizations in the Industry, grouped under the ægis of the British Gas Federation, which we reproduced in our Nov. 10 issue. "I have endeavoured in my Address," said Mr. Rogers, "to indicate that the Society has in the past taken its full share in the advancement of the Industry by encouraging co-operation, by the co-ordination of interests, and by collaboration with all sections of the Industry. I am convinced that it is only by such unification that we shall be able to create for ourselves an unassailable position in the world of competitive endeavour. Ours is a goodly heritage—let us prove worthy of it."

Another admirable Gas Industry Exhibit was staged at the Birmingham Section of the British Industries Fair. The general excellence of the Exhibit as a whole was the subject of favourable comment on all sides, and it seems to have been widely agreed that the Gas Section was fully the equal of any other representative section in the Fair. The response which the Society's members make year by year in support of this national effort merits the fullest possible recognition, for it is well known that prestige publicity of this nature does not bring with it a direct monetary return in any way comparable with the financial outlay involved.

As in previous years, close on the heels of the B.I.F. came the Ideal Home Exhibition at Olympia, where again manufacturers of appliances staged a further series of admirable exhibits. The Industry was represented even more thoroughly than ever before throughout the Exhibition, thus affording striking evidence that modern gas service is regarded in sober fact as veritably part and parcel of the home of to-day.

The Council of the Society, as in previous years, has awarded Silver Medals to each of the Junior Gas Associations for the Paper adjudged best among those presented during the year by members at a general meeting. Prizes have also been awarded in the City and Guilds of London Institute Examinations in Gas Works Practice, Gas Supply Practice, and Gas Fitting. The Council has also made a donation to the Department of Coal Gas and Fuel Industries, Leeds University, for the purchase of books and periodicals especially suitable for the library.

The Society's subscription to the B.C.G.A. has been maintained and in many other directions which space does not permit us to enumerate the Society is co-operating in the corporate activities of the Industry. Its Annual Report, it may be recalled, disclosed that returns from 110 of its members showed a total expenditure by them in connection with the Gas Industry on research, development, exhibitions, advertising, and general propaganda of £570,000 annually.

The weekly columns of the "JOURNAL" testify to the increasingly important part which the Society plays in the activities of the Industry, and associated intimately as we were happy to be with its formation we trust we may recall with pardonable pride and satisfaction that what was, more than 30 years ago, regarded by many as a venture of problematical value has lived and prospered to realize, perhaps even to exceed, the hopes and aspirations of those who at that time advocated its formation. It seems perhaps particularly appropriate to mention this matter at the close of 1937, for early this year the Society, and indeed the Industry, sustained a great loss in the death of Charles Clare, the Society's founder and first Chairman. "Those," wrote Mr. F. B. Richards, "who came in contact with him will remember him as a man of gentle disposition and honest purpose, and though we shall now see him no more at the gatherings of the Industry his memory and our sense of loss will remain."

Technical Developments

Turning now to technical developments during the past year, and dealing first with gas manufacture, great technical interest attaches to the gasification of coal and semi-coke in an atmosphere of hydrogen. The results of research on this fascinating problem have been reported to the Institution. The work is being undertaken by the Joint Research Committee of the Institution and Leeds University, and the results to date are certainly remarkable. When treated in hydrogen at pressures above atmospheric it has been shown that coke yields very high outputs of gaseous hydrocarbons. For example, at 50 atmospheres the yield was equivalent to 276 therms per ton, and at 100 atmospheres to 311 therms. What is of importance from the point of view not only of the Gas Industry but of national coal resources is the fact brought out as a result of the research that hydrogen reacts not only with gas coals, but with a range of coals differing as widely as lignite and semi-anthracite. The new technique, if it can be developed on a commercially sound basis, would be applicable to a wide variety of fuels. At present it is, of course, outside the sphere of practical economics. At a pressure of 10 atm. the calorific value of the gas made by heating semi-coke in hydrogen was 500 B.Th.U. per cu.ft., while at 100 atm. it was 914 B.Th.U. The calorific value of the gas obtained with a given pressure, moreover, could be varied by modification of the rate of heating the coke or the rate at which hydrogen was supplied. This indicates the flexibility of the process. It has been shown that something like two-thirds of a charge of semi-coke can be gasified in hydrogen yielding a gas

containing over 30% of methane and possessing a calorific value of over 500 B.Th.U. Should future developments render the process an economical proposition, the bearing of this on the Gas Industry's dependence on the coal market is apparent; and the fact that such a wide range of fuels can be treated is of importance in this regard. Then there is the possible sphere of the process as an enricher, and technically the process holds out possibilities in ensuring the uniform supply of gas of the right characteristics to give at all times the best performance at the burner.

The research work undertaken during the past twelve months on the problem conveniently expressed as the "combustion characteristics" of gas has shed much light on a complex problem, investigation of which is of the greatest importance. The point has been made clear that if the best results are to be obtained from modern gas appliances constancy of calorific value alone is not sufficient; the rate and manner of combustion of a gas are only second in importance to the actual amount of heat developed. Wide variations in bunsen flame sizes can be produced with gases covering a similar range of calorific value, and throughout the country the gas consumer is probably getting a result which falls far short of that which a domestic gas supply is capable of yielding. In the future, gas composition may change considerably compared with the present day. Consumers demand an ever-increasing standard of heat service, and we must make sure that progress in other directions does not lead to an increase in the number of noisy burners, appliances lighting-back, and the like. At Leeds the fundamentals of the problem are being attacked, and a Report of the findings to date was presented at the Autumn Meeting of the Institution; and the Industry has now available, in the aeration test burner developed at Watson House, an instrument, not of scientific precision, but capable of acting as a rough criterion of the satisfaction or dissatisfaction of the consumer.

Removal of Sulphur Compounds

During the year a great deal of progress has been made in connection with methods for removing organic sulphur compounds from gas. Outstanding work has been carried out by the Gas Light and Coke Company, the results of which were described in an Institution Communication last November. Catalytic elimination of nitric oxide from gas has led to the discovery that organic sulphur compounds can simultaneously be removed by the one catalyst. Gas treated by the new catalytic process should be entirely free from troubles due to the formation of gummy deposits and should be capable of combustion in a flueless appliance with the formation only of traces of sulphur oxides. One of the chief virtues of the catalytic process is, perhaps, that it is independent of benzole recovery from the gas. Installation of a catalytic unit prior to an oil washing plant would render the benzole free from carbon bisulphide. Research on gas catalysis has revealed a new view of the future possibilities of a more generally acceptable gas supply. Also during the year an oil washing plant has been erected in which the thermal efficiency of the oil washing process has been improved by the adoption of improved heat exchange auxiliary plant and, at the same time, the advantage of distillation under reduced pressure has been realized. These advantages in the oil washing process may be applied to the recovery of benzole quite independently of the removal of sulphur from gas. In regard to this new development, a fair estimate of steam consumption would be 34 lb. in winter and 40 lb. in summer per gal. of benzole recovered when extracting 3·7 gal. per ton of coal and removing 75% of the sulphur from vertical gas or a rather higher proportion from gas from horizontal retorts.

In regard to complete gasification, Mr. C. F. Broadhead, of Melbourne, has given an account of the plant which he has developed in Australia. This plant produces gas continuously. It consists of three generators, and the gas-making cycle is such that while one of the generators is on the "blow" the other two are on the "run"—either up-run or down-run depending on the particular phase of the cycle. When a generator is down-running tar or oil is cracked to gas by spraying it on to the fuel bed of that generator. The Fuel Research Board has been working on the complete gasification of bituminous coal in water gas plants. If non-caking coals can be substituted for coke in the manufacture of water-gas the flexibility of the process of gas manufacture is increased and it becomes possible for the Gas Industry to offer more coke for domestic and industrial processes. By using a recuperator to assist in the cracking of the tar vapours, success has been achieved in treating bituminous coals of 30-40% volatile matter without having any tar troubles. The most important property necessary in the coal is that it should be in lump form and have only sufficient caking index to avoid disintegration in the fuel bed and to cohere without forming large masses of coke. The yields obtained with one "not too suitable coal" were 70,000 cu.ft. of gas of 304 B.Th.U. per cu.ft., equivalent to 210 therms, and it is confidently felt that the figures will show an improvement as the result of further experiment. Further work has been reported on the steaming of the charge in horizontal retorts. This work was undertaken at Widnes, and the results show that, with the method of working adopted, steaming can effect an increase of 8 therms per ton of coal carbonized. There was no pointing to any saving in the cost of the therm produced. Indication was rather that the cost per therm is slightly increased, but not sufficiently to have any appreciable influence on the financial results. Steaming in horizontals is clearly a matter to be considered in the light of particular local circumstances.

Open Grate Cokes

Interesting work has been done on the production of domestic cokes from sized weakly-caking coals. An investigation undertaken jointly by the Edinburgh Gas Department and the Fuel Research Board has already shown highly promising results. Sized coal has been carbonized in continuous vertical retorts, the temperature of carbonization being reduced so as to leave from 4 to 6% of volatile matter in the coke. The coke was entirely satisfactory and compares favourably with coke made by carbonizing similar coal under normal gas-making conditions. It has been stated that the extra price obtainable for the coke should more than balance the lower gas yield, and the balance of gas and coke production would not be disturbed to as great an extent as if the full yield of gas were realized. The results have also been reported of work done in the production by high temperature carbonization in coke ovens of open grate coke from Scottish coals. The cokes made from sized nuts were much more combustible and efficient, and were in every way superior open grate fuels to those made under the same carbonizing conditions from the same coals when crushed. The special domestic oven coke was compared with low temperature cokes at present being made in Great Britain; and from the results "it is apparent that the special domestic oven coke compares very favourably with any of the open grate fuels at present being marketed." Our quotation is from a description of the investigation by Dr. W. Davidson, of Radiation Limited.

The work of Mr. Jamieson and Dr. King on the carbonization of cannel has been carried a stage further, and the results have been reported. The results show that carbonization under gas making conditions compares favourably with low-temperature carbonization in the following respects: The yield of gas by the latter process is much less, although its calorific value is higher; the yield of tar by the latter process is a few gallons less, and is not greatly superior to the high-temperature cannel tar for the purpose of hydrogenation; the combustibility of the low-temperature coke is only slightly higher. The utilization of cannel centres on the availability of the supply, and this problem has been investigated by the Oil from Coal Committee of the Scottish National Development Council. It is estimated that in Scotland there are reserves containing less than 8% of ash amounting to 25½ million tons, of which 20½ million tons are in the Lothians. The potential daily output is given as 1,438 tons, representing something in the neighbourhood of 500,000 tons per annum. Assuming this to be of a quality comparable with the Newbattle cannel on which the tests were made

at Edinburgh, it would produce 70 million therms, or 65% of the gas supplied by statutory undertakings in Scotland, and on this basis the reserves would last for at least 50 years. On the subject of hydrogenation we have had the statement of Lord McGowan on the working of the plant at Billingham. At the annual meeting of Imperial Chemical Industries he explained that up to date—the meeting was held at the end of April—the plant had not shown results which would justify its description as a good commercial proposition even with the advantage of the existing Customs duty, and that without that protection the enterprise would, of course, be uneconomic.

An important development during the year has been in connection with the equipment for burning gas fluelessly; and in regard to the general question of the use of gas in this manner we have had the Report of the Advisory Committee of the Royal College of Physicians, in which one of the conclusions is that, with correct gas rate, flueless gas heaters can be employed with absolute safety in rooms not provided with a flue. It has been estimated that the introduction of flueless heaters into halls and passages in smaller property would, on the basis of one such heater per home, represent an increase of nearly 50% in the sales of gas. Then much advance has been made in equipment for burning gas fluelessly to take the chill off the air in rooms provided with gas fires connected to a flue, the object being to provide a satisfactory heat service by the combination of radiant heat, adequate ventilation, and some measure of central heating by the use of independent flueless gas units. Gas used through the medium of these independent units is employed at a thermal efficiency of 90%; and where attractive two-part tariffs are in operation this low gas rate air-heating represents a type of heating which cannot be countered from the cost point of view by any form of competition.

Public Lighting

The past year has seen remarkable developments in gas street lighting equipment. The combined efforts of the Industry and the manufacturers of lighting equipment have resulted in a vast improvement in the performance of the wide range of fittings now available. A notable advance has been the setting up of an *ad hoc* Committee, comprising members of The Institution of Gas Engineers, the British Commercial Gas Association, and the Society of British Gas Industries, to review the whole question of public lighting by gas and to make recommendations covering not only the technical and commercial aspects, but also the broad policy of the Industry in regard to the general problem of public lighting. The efforts of the Committee have already borne fruit, and there exists today a greater degree of co-operation of effort than ever before.

The improvement we have mentioned was for all to see during the highly successful Conference of the Association of Public Lighting Engineers at Folkestone last September. The really magnificent display staged on that occasion was calculated to convince anyone responsible for local administration that gas is the very reverse of a back number for the adequate illumination of our highways under modern and exacting conditions. At the Conference a new departure in low-pressure gas lighting was introduced. This new lamp is a highly interesting development. Contrary to the practice in normal low-pressure lamps, no secondary air is allowed to enter the globe. Instead, by an ingenious arrangement of syphon tubes, secondary air is "pushed" to the burner at a pressure slightly above atmospheric and sufficient to overcome the resistance of the mantle. A figure of 300 lumens per cubic foot of 500 B.Th.U. gas is given for this lamp, which is a truly remarkable performance. The new lamp is an example of what is being done by the manufacturers of lighting equipment to strengthen the gas lighting load; and with such developments there is no need for pessimism regarding the part which gas will play in the future in the illumination of our streets.

In November last the Ministry of Transport Departmental Committee on Street Lighting published their Final Report, and there is no doubt that it will have a far-reaching effect on the illumination of our roads. The Committee recommend the division of roads into two classes only—"traffic routes" and "other roads." "Traffic routes" comprise all roads on which the standard of lighting should provide an ample margin of safety for all road users, without the use of headlights by motor vehicles. "Other roads" are all those which the responsible authority considers should be lighted. Several departures from the existing voluntary standards are recommended. Test-point illumination values as a measure of the efficacy of any scheme are no longer desirable. The recommendation of the Street Lighting Committee means that a lighting installation is to be assessed not by the amount of illumination falling on a road, but in the visibility it affords. As to the rating of light sources, this should be in terms of the total light output of the lantern in lumens. The Gas Industry welcomes the fact that it is the lantern as a whole, and not the bare source, which is the basis of rating.

A mounting height of 25 ft. for traffic routes is recommended, and an average spacing of not more than 150 ft. on straight roads. The amount of light to be provided per 100 ft. linear of road having a carriageway not more than 40 ft. in width should exceed 3,000 lumens and should lie between this value and about 8,000 lumens. These figures refer to the average luminous output throughout the life of the source. In this regard gas has everything in its favour. With economic maintenance its output is practically constant—so much so, in fact, that many gas undertakings undertake to maintain the lighting efficiency of an installation within 25% of the initial value, and in recent contracts have even accepted a contract obligation on a basis of 20% variation. Moreover, the actual light sources—the mantles—are relatively inexpensive to replace, so that their renewal when necessary is economic; and they show no marked falling off in light output over the whole of their working life.

The Committee condemn single side mounting except at bends and recommend that the staggered arrangement is the most suitable for general adoption on straight roads. They point to the disadvantages of central suspension, though they observe that in certain circumstances this may be the only solution. "Other roads," of course, constitute by far the greater mileage of roads—some 75% of the roads of the country. These roads, too, are for the most part already lighted by gas. We have urged in these columns that the Gas Industry should ensure that this gas lighting is giving such a performance that it can easily withstand competition from electricity. Our Industry has excellent equipment for the lighting of these roads, the satisfactory illumination of which requires a technique distinct from the lighting of main traffic thoroughfares. Gas can adequately fulfil all the requirements set out in the Report, and it offers at the same time the greatest dependability, economy, and the highest standard of maintenance of uniform results.

The Coke Market

The year may almost be said to have been a record one for coke, but, while shortage conditions have been experienced in some areas, this has not been universal, and little hardship has been experienced. Coke marketing conditions—at any rate, so far as the southern counties are concerned—are largely the story of the activities of the London and Counties Coke Association, and if any lesson can be learned from the past year it is the need for similar organizations to cover other parts of the country. In this connection it is gratifying to note that a Midland Coke Association has now been established and already has the support of 75% of the coke produced in the area. The associations which were formed some time ago north and south of the Tyne and the North-East Coast Coke Producers' Association are proposing to amalgamate into one body and to enlarge the scope of their work on the lines of the London scheme, while conversations have been undertaken with the national body representing the furnace coke interests with a view to greater co-operation between the two industries. These facts alone make the past year an outstanding one from

the viewpoint of coke marketing developments. But the general trend of events serves also to emphasize the necessity for setting up a nation-wide series of organizations before market conditions become difficult—as they are bound in time to do for reasons which are clear to everybody.

Within the area of the L.C.C.A. the price level of gas coke has increased by 3s. 4d. over last year's figure; in other parts of the country there have been increases in varying degrees. The export market for gas coke has been maintained, and f.o.b. prices have been substantially increased. In this connection reference should be made to the formation of the International Coke Cartel which has been established for the regulation of the coke export market throughout Europe. The member countries are Belgium, Germany, Great Britain, Holland, and Poland. The importance to the Gas Industry of the export market is obvious from the total of nearly one million tons shipped during the year. Members of the L.C.C.A. have co-operated in the completion of the arrangements for the International Cartel and the formation of a body known as the Gas Coke Export Association.

The production of gas coke has increased, that within the area of the L.C.C.A. being greater by 400,000 tons than last year. This is evidence once again of the elasticity of gas-works carbonizing practice which we have so frequently extolled in the columns of the "JOURNAL." Thus the Industry has been enabled to retain, in spite of heavily increased demands, a considerable amount of coke business which might otherwise have passed to competitive fuels. The breeze position is still difficult, and there has been a shortage in most areas, while the quality of coke generally which has come into the domestic market has unfortunately not maintained as high a standard as last year. Such troubles are bound to be experienced so long as producers are unable to obtain the particular qualities of coal they desire for carbonization. The standard nomenclature and sizes of coke as used by the L.C.C.A. are being increasingly employed by other sections of the Gas Industry—which is all to the good.

The distributive trade which normally deals with furnace coke has found considerable difficulty in obtaining supplies, and it is estimated that little more than 750,000 tons have entered the London market during the year, which is probably half the normal market requirements. The Coke Distributors' Branch has grown in strength during the year and has established beyond all question its value to both distributors and producers. Membership in the L.C.C.A. area now numbers over 3,500 and includes practically everyone who is concerned with the distribution of coke in the area.

On the research side, the Association has been unceasing in its efforts to explore and develop new outlets for coke, and the technical staff has been increased to this end as well as to assist member undertakings in their coke utilization problems. The popularity of the open coke fire is steadily growing, and, earlier suspicions having been overcome, most gas undertakings are interesting themselves in the application of coke grates in cases where gas is unsuitable or uneconomic. In any event, the ignition burner, which forms a part of all modern coke grates, in itself provides a useful load for gas. The demand for the domestic coke boiler is also increasing, and the British Standards Institution have issued a Specification covering the minimum size of domestic boiler, while a Committee has been set up to deal with constructional details with a view to providing a better appliance. In the central heating field the gravity-feed coke boiler is fulfilling a very useful function, and, in conjunction with one or other of the several types of thermostatic control now available, provides a system as nearly automatic in operation as gas. Several new makers of this type of boiler have come on to the market during the past twelve months.

Before leaving the subject of central heating one very important step should be mentioned. Arrangements have been made with the National Association of Heating, Ventilating, and Domestic Engineering Employers, and the L.C.C.A. has set up a Joint Committee with heating engineers which meet from time to time. It has been appreciated that while the latter deliberations are concerned primarily with the utilization of coke, the opportunity of co-operation offered by this contact with heating engineers should be extended also to gas, and heads of agreements in this respect have been satisfactorily settled. This alone should be sufficient to counteract any possible fears that the operation of organized coke marketing schemes may be detrimental to the progress of gas. Another service recently provided by the L.C.C.A., incidentally, is the distribution to member undertakings of advice regarding potential coke utilization jobs which come to its notice.

Turning to the larger-scale applications of coke, it may be said that grass-drying is now a "going concern;" and, indeed, so satisfactory has been the operation of the semi-producer furnace that applications have been received from many other industries concerned with drying processes for similar furnaces for their own use. Reference to the application of coke heat for lifting fog sufficiently high—50 ft. is claimed—to allow of the safe landing of aircraft at aerodromes has already been made, and this matter is now under "official consideration." Similarly, plant for protecting fruit trees against sudden frosts in the spring is growing in popularity. Progress is also being made in the design of a suitable coke-fired furnace for the glass bottle trade.

Much useful work has also been done during the year in connection with the testing of coke-using appliances, and the L.C.C.A. is shortly to issue an approved list of such apparatus. Not only will this safeguard the interests of consumers, but it will serve a very useful purpose in bringing home to appliance manufacturers that unless their goods come up to certain standards of design, construction, and efficiency laid down by the Association they will not be used by members. It is interesting to note that combination gas and coke appliances are shortly to be added to this list.

It may truly be said, therefore, that the past year, from the aspect of coke marketing, has been one of considerable development. The public trend towards the greater use of smokeless fuels is gaining ground, and coke has undoubtedly strengthened its position during the year.

By-Products

The Report of the British Sulphate of Ammonia Federation 1936-37 shows a further increase, amounting to over 200,000 tons, in the world production of nitrogen, and the output now amounts to the record figure of almost 2,600,000 tons of nitrogen per annum. Production of nitrogen in the form of by-product ammonium sulphate has shown an increase of approximately 30,000 tons, but is not yet up to the record figure of 425,000 tons established in the year 1929-1930. In spite of the large increase in total nitrogen production, consumption has more than kept pace, and has also reached a record figure amounting to 2,675,000 tons per annum. Although synthetic plants have been operated at approximately 50% capacity only during the year, the output of synthetic nitrogen has again reached record figures. In Great Britain the production of sulphate of ammonia has increased during the year 1936-37, but the amount of coal carbonized has also increased. As regards consumption in Great Britain, there has been a further small increase during the year 1936-37, but the consumption is not yet up to the figure attained in the War years.

As regards prices, home prices have remained the same as last year, but there has been a drop in the prices obtained for exports. At the present time the prospects are better, and export prices have improved, so that the return to the sulphate manufacturer should be rather better during this year. The cost of manufacture of sulphate of ammonia at gas-works and coke ovens has again increased, mainly owing to higher prices having to be paid for acid, but wages and costs of other materials have also advanced. The tendency in the manufacture of by-product sulphate is for gas and coke oven works to concentrate their liquor and transfer it to central works, and quite a large number of plants for the production of concentrated ammonia liquor have been erected during the past year. There is no doubt that this is the best method of obtaining the highest return for by-product ammonia.

Tar and Tar Products

The annual production of gas-works tar in Great Britain has gradually increased during the last few years, the latest statistics available being those for 1936 when the quantity produced approximated to 234 million gallons. This represented an increase of 14 million gallons on the figure for 1935, corresponding to the difference in the amount of coal carbonized. The increase in production of coke oven tar was relatively much greater, as would be expected from improved trade conditions generally. Sales of road tar for home consumption have, nevertheless, decreased steadily. This was not altogether unexpected, as improved methods of refining have produced tars with a much longer life in practice, with the result that the annual requirement of tar for surface dressing has diminished. Fortunately, this has been counterbalanced by increased exports of refined tar, but it is, all the same, a serious difficulty the Industry has to face. Some crude tar is also exported, but the demand is mainly for the refined product. France is responsible for a large proportion of our export trade in tar.

The co-operative tar schemes at present operating in various parts of the country benefit tar distillers in so far as the latter are assured of regular supplies of crude tar over a long period. This enables them to install new equipment, and there is a tendency at present to introduce modern pipe still units, four having been brought into operation during the present year. Details of their working are not yet available, but they should prove quite successful, judging from the experience gained with this type of plant on the Continent. In addition to reduced fuel and labour costs they have the advantage of lower pitch production and greatly improved fractionation of the liquid products. This latter feature enables the naphthalene and phenols in particular to be concentrated in separate narrow fractions. This is in itself only an advantage where the market exists for these products. Further information regarding the working of these new distillation units will be awaited with interest. They should assist materially in maintaining the quality of the products—*e.g.*, refined tar—at a constant level.

It is an advantage to be able to modify the setting properties of road tars according to the purpose for which they are to be used, and the blending of crude tars makes this possible. For this purpose a thorough knowledge of the properties of high and low aromatic crude tars is essential, and the recently published work of W. G. Adam and co-workers at Beckton should be of value to distillers handling both crudes. These workers confirm that completely satisfactory road tars can be produced from low aromatic crudes if due regard be paid to their particular characteristics. Reasons are also suggested for the recognized high durability of these tars.

A particular feature of 1937 has been the interest displayed in thin tar carpets for roads. As the result of research the conditions governing the manufacture and laying of satisfactory tar carpets have been closely defined, particularly with regard to the type and quantity of tar used in relation to the nature and grading of the aggregate. Developments concerning tar carpets can be confidently expected during 1938. The excellent brochure on the subject, published this year by the South Metropolitan Gas Company, gives some idea of the amount of research work carried out.

The Ministry of Transport has removed any ban which existed on the use of tar in proximity to fishing streams, provided tar is used which complies with a very strict specification and analysis. Such tar is now being supplied and can be used on roads draining directly into fishing streams. By complying with certain regulations and requirements producers may obtain a licence from the British Road Tar Association entitling them to apply the registered name of " Brotox " to this tar.

It is estimated that gas-works in 1936 produced approximately 15·5 million gallons of motor benzole or 30% of the total from gas-works and coke oven installations. This represented an increase of about 10% over the previous year, and a further increase should be reported for 1937. The potential production of benzole at gas-works is about double the present figure, so there is ample opportunity for expansion. Production at existing coke oven plants is almost at saturation-point. The development of the oil-washing process for the removal of organic sulphur compounds from the gas will bring about an increase in the amount of carbon disulphide, &c., in the crude benzole. With this in mind it is interesting to note the increasing employment of the Yorkshire Tar Distillers' ammonium polysulphide process for removal of CS_2 and free sulphur. Arrangements have been made for supplies of the reagent required for this process to be available in various parts of the country. Benzole mixture maintains its popularity as a motor spirit, and the National Benzole Company is in a position to deliver promptly to all parts, so that increased production should be met by a ready sale.

Phenol has been in good demand, as evidenced by the temporary exemption of synthetic phenol from Key Industry Duty. Good prices have been obtained, but, as one would expect, buyers are reluctant to place long contracts in case the price should ease. The position has been much the same with the various grades of cresylic acid, but as the demand is expanding there is little likelihood of any considerable reduction in price for some time to come. The plastics industry has almost unlimited scope, and despite the variety of materials now used in the manufacture of these products the demand for phenols as a raw material should continue.

Pyridine bases have been in good demand at high prices. High prices have the effect, however, of prompting a search for substitutes. This has happened before in relation to tar products and it may happen again, particularly in this case.

Naphthalene has been in good demand, but expanding production has resulted in somewhat lower prices, and here again long contracts are not being placed. Both the home and overseas markets for creosote have been active and good prices have been obtained. At home, the demand for creosote for hydrogenation is still a notable feature. The existing German embargo on exports has helped materially in maintaining our export trade in creosote, particularly to European countries. Tar oil as a diesel-engine fuel is a subject still attracting the interest of producers, and attention is drawn to the results obtained by German workers using blends of tar oil and the diesel-oil fraction obtained by the Fischer-Tropsch process. The fact that a satisfactory diesel fuel can be thus obtained is of importance at the present time when most countries, including our own, are taking a keen interest in the question of home produced liquid fuels.

The pitch position has been very unsatisfactory, large stocks having accumulated and low prices prevailed. New outlets have been sought, such as blending a small amount of pitch with gas retort or coke oven charges, but there is little development to report. Plants have been in operation for the production of pitch coke, but progress in this direction has not been extensive. Tentative investigations into the use of hard pitch as a boiler fuel have been conducted by the Fuel Research Board, whose recent report indicates that " there is no reason why a technique should not be developed for using hard pitch in powdered form in boilers if circumstances make this desirable." The relatively high prices obtainable for the oil recovered during the manufacture of the hard pitch will assist in obtaining the fullest value for the pitch used in this process.

Stocks and Shares

An unprecedented number of diverse factors have dominated Stock Exchange affairs during the year. The general depreciation of values—and in a large number of cases the falls from time to time have reached serious proportions—is, of course, unfortunate, but there has been one outstanding feature throughout the whole period, viz., the strength of the trade position in this country as exemplified by the many good industrial reports and the monthly Trade Returns indicating the growing expansion of our export business.

With the exception of the outburst over the N.D.C. in its original form, which was a factor of such importance at Budget time, the unsatisfactory state of markets can be attributed almost wholly to the political and financial

crises abroad. Spain has been at war throughout the whole period, and for the past four months Japan and China have shared a similar plight. France has had its financial difficulties, and latterly a serious slump on Wall Street has played havoc with prices.

All classes of securities in every market have suffered considerably, particularly " ordinaries," and, be it noted, in spite of the electricity complex of the Government, local authorities, and by no means so large a section of the public as our competitors would have us believe, many electrical " ordinaries " have depreciated to a greater extent than gas stocks. For example, it will be seen in the table below that Gas Light units are now only 1s. below last year's price. The County of London Electric Supply units on which a dividend of 10½% was paid in 1936, or nearly twice that distributed by the Gas Light and Coke Company, were quoted at 53s. 6d. in December, 1936, but have now fallen to 48s., a drop of 5s. 6d., and this is by no means an isolated case. It is satisfactory to note, however, that the values of British Funds, with few exceptions, have stood up to the position very well and many are now only a bare point or two below the price at which they stood a year ago.

It will be recalled that during 1936 a large number of gas stocks made good progress, but prices for the current year, for no other discernible reason than sympathy with markets in general and an all-round adjustment of yields, in the majority of cases show a considerable loss over the period. It will be seen by the tables below that preference and debenture issues have not depreciated to such an extent as the ordinary stocks, and, when it is realized that 2½% Consols are 10 points down on the corresponding date last year they have not fared too badly.

Ordinary Stocks.

—	1936. Dec. 4.	1937. Dec. 3.	Decrease.
Alliance and Dublin	167—172	161—166	6
Brighton 5%	153—158	133—138	20
Bristol	118—120	116—117	2½
Cardiff	128—133	125—130	3
Commercial	93—98	82—87	11
Croydon sliding-scale	158—163	140—145	18
Gas Light units	26/—27/-	25/—26/-	1/-
Liverpool	132—134	125½—127½	6½
Newcastle £1 units	28/—28/6	23/—23/6	5/-
Portsmouth and Gosport	178—183	164—169	14
Sheffield	146—148	144—148	1
South-Eastern Gas Corporation	27/—29/-	23/—25/-	4/-
South Metropolitan	113—116	101½—103½	12½
South Suburban	130—135	120—125	10
South-Western Gas Corporation	21/6—23/6	18/6—20/6	3/-
Southampton	112—117	111—116	1
Tottenham	152—157	132—137	20
Wandsworth	159—164	140—145	19
Watford	157—162	140—145	17

Preference and Debenture Stocks.

—	1936. Dec. 4.	1937. Dec. 3.	Decrease.
Commercial 3% deb.	83—88	73—78	10
,, 5% deb.	122—127	113—118	9
Croydon 5% deb.	125—130	113—118	12
Gas Light 4% pref.	105—108	100—103	5
,, 3% deb.	84—87	77—81	6½
Mid-Southern 4% pref.	102—107	96—101	6
Newcastle 4% pref.	104—105	98—100	5½
,, 3½% deb.	100—102	90½—91½	10
South Metropolitan 6% pref.	145—150	131—136	14
,, ,, 4% pref.	104—107	98—101	6
,, ,, 3% deb	86—89	75—80	10
South Suburban 5% pref.	122—127	110—115	12
,, ,, 4% pref.	102—107	95—100	7
,, ,, 5% deb.	123—128	115—120	8
Tottenham 5% pref.	120—125	110—115	10
,, 4% deb.	102—107	97—102	5
Wandsworth 5% pref.	104½—107½	99—102	5½
,, 5% deb.	127—132	115—120	12
,, 4% deb.	103—108	97—102	6

Despite the keen competition and difficulties of the past few years, holders of gas stocks and shares have received their usual rates of dividend with almost monotonous regularity. In some instances increases can be noted while only in a few isolated cases has any fractional loss been sustained. Unfortunately, there are still troubles to be faced, such as increases in the cost of coal, other miscellaneous materials and wages, but especially coal, as those companies now making new contracts are fully aware. The difficulties have already been realized in some quarters by our competitors, and increased charges to the consumer have resulted. The Gas Industry is in a better position, however, to meet these heavier costs by reason of the anticipated higher receipts from residuals, and in this connection it should be noted that the recovery of benzole is playing an increasingly important part. Whether these larger receipts will wholly compensate for the extra burdens is problematical, and here and there some small addition to the price of gas may be inevitable.

Investors can be assured, however, that all possible steps will be taken to safeguard their interests and those of the good consumer, so that holders of and intending investors in gas securities should have no misgivings as to the future of a class of investment which for many years, through good times and lean, has proved of outstanding merit.

Obituary

Each year inevitably brings with it the passing of distinguished men, and no retrospect of 1937 would be complete without brief reference to some eminent names whose memory will remain as outstanding examples of a lifetime of service devoted to furthering the interests of the Industry in one direction or another.

Largely remembered for the prominent part he played in the formation of the Society of British Gas Industries, CHARLES CLARE died on Jan. 20. For forty-four years he was with Fletcher, Russell, & Co., Ltd., and had been on the Board of the Company since 1897, for fourteen years of which he was Chairman. For fourteen years he was on the Board of Radiation Ltd. With the passing of C. F. BLINCOE on Feb. 10, there was lost one of the leading authorities on the use of coke oven gas for town supply. Mr. Blincoe, who had been Engineer and Manager of Middlesbrough Gas Department since 1916, was President of the North of England Gas Managers' Association in 1929. On the same day, the death occurred of W. D. HELPS, who was Chairman of the Society of British Gas Industries in 1913. Feb. 24 saw the passing of FRANK BUSH, a Director of the South Metropolitan Gas Company, who became Secretary of the Company at the then very early age of 32. On July 18, the death occurred of HAROLD NEWSOM DAVIS, Managing Director of the Davis Gas Stove Company, which was founded by his father in 1895. He was one of the first to sponsor continuous casting plant, and many other technical improvements with which he was connected were of great importance in the development of the gas cooker.

Barely a month after his appointment as General Manager and Secretary of the Sunderland Gas Company, J. H. CURRY died on Aug. 4. During his thirty-seven years' service with the Manchester Gas Department, J. H. SILLITOE, who passed away on Sept. 18, filled many important posts in the Gas Industry. He became Commercial Manager and Secretary of the Gas Department in 1928. In 1919 he was appointed Hon. Secretary of the North-Western Area of the National Gas Council, and he took a prominent part in the deliberations which led to the settlement of the gas strike of 1920.

Twice President of the Waverley Association of Gas Managers—in 1895 and 1930, of the informal meetings of Scottish gas managers in 1909 and 1910, and of the North British Association of Gas Managers in 1914—DAVID VASS died shortly after retiring from the position of Engineer and Manager at Perth.

Only four days after he had attended the Autumn Research Meeting, the death of RALPH E. GIBSON, Engineer of the Liverpool Gas Company, came with tragic suddenness on Nov. 10. In 1923, Mr. Gibson was President of the Manchester District Association of Gas Engineers. In 1932, he was elected President of The Institution of Gas Engineers.

Another Past-President of the Institution passed away on Nov. 21 in the person of Sir JOHN FERGUSON BELL, Chairman of the Derby Gas Light and Coke Company. Sir John's career in gas engineering, administration, and consulting work was marked with conspicuous success. In

1925 he was elected President of the Institution, but the honour might have come to him in 1913, had it not been for the gracious act whereby he stood aside that Sir Corbet Woodall might hold office during the Institution's jubilee year.

With the passing of SAMUEL CUTLER on Dec. 7, the Industry lost a great engineer, and many industrial concerns a valued member of their boards. He travelled widely in connection with the business of Messrs. Samuel Cutler & Sons, and on those occasions his considerable linguistic abilities were a great asset. He was Chairman of the Council of the Society of British Gas Industries in 1919-20.

"GAS JOURNAL" Calendar and Directory

Enlarged Scope of the 1938 Edition

By the end of this week the new edition of the "GAS JOURNAL" Calendar and Directory will be in the hands of "JOURNAL" subscribers, and we venture to suggest that it will prove of even greater all-round usefulness as a book of daily reference than preceding volumes of the work. This is the eighth year of publication of what must be the most widely consulted reference to the Gas Industry's activities. As before, in presenting the 1938 edition, the needs of all sections of the Industry have been considered; and, taking into account the range of the field, a veritable mine of information is available in the handiest possible form. This matter of handiness and convenience was made paramount when we designed the book; and to those qualities we attribute largely the rapid establishment of its popularity in the Industry.

The information throughout is essentially up to date, and may be regarded as a guide to the Gas Industry's trends and developments. For example, the growth of amalgamation and grouping of gas undertakings can be readily viewed in the section of the Directory setting out particulars of holding companies; and the extent to which tariffs alternative to the flat rate have been adopted can be seen from the information relating to individual undertakings. This information, by the way, is more complete than ever before, an indication of the greater value placed on these statistics, the compilation of which is solely dependent on the willing co-operation of the many undertakings. A new feature—an innovation which we feel sure will meet with widespread approval—is the substitution for the diary pages of rulings for "Monthly Statements of Manufacturing Results." To have these results conveniently at hand for comparative purposes should prove most useful; and the rulings have been designed to be generally applicable.

As we have said, the Calendar and Directory is planned to satisfy the requirements of all sections of the Industry, of those responsible for the administration and management of gas undertakings, of those concerned with the manufacture and distribution of gas, coke, and by-products, of the buyers and manufacturers of gas plant and appliances. That the book does indeed meet these requirements is probably best proved by a glance at the advertisement graph. For the sixth time since first publication in 1931 we record an increase in the advertisement section. The 208 pages of displayed advertisements in the new edition represent an increase of 8% on 1937 and of no less than 65% on our starting point.

Our main purpose here, however, is to point to a few of the new features of the "Handbook," revised each year by Colonel W. M. Carr and his collaborators, which consists of a memorandum on gas-works practice, with general information and a host of tables for daily reference in the gas and allied industries. Notable developments have taken place during the past year in the removal of organic sulphur compounds from town gas. Reference to these developments, both in the oil-washing process and in the catalytic process, finds its place in the 1938 edition. Coke oven gas is being purchased in greatly increasing quantities by gas undertakings, and this phase of the Industry's activities finds its reflection in a new section on coke oven gas in the Handbook, and, as a corollary, extended information on high-pressure distribution of gas. Another question which has received much more attention during the year, and particularly in recent months, is the maintenance of gasholders in satisfactory working condition. Here again new information on this subject, together with useful comments on welded holders, is to be found in the 1938 edition. The application of gas to industrial processes proceeds apace; and a new section on industrial gas is in keeping with this growth. Therein, such problems as atmosphere control, automatic temperature control, air conditioning, and central heating are discussed. New information is given, too, on boiler feed water treatment and on electrical precipitation of tar from hot gas. These are indications of the enhanced usefulness of the Handbook part of the Calendar and Directory, which, in fact, is a text-book of modern gas practice and will be the daily companion of the gas engineer throughout the coming year.

Finally, two recommendations. In the first place, let each subscriber who obtains his "JOURNAL" from a newsagent see that early application is made for his Calendar and Directory. Secondly, let each possessor of the book keep it up to date during 1938 by referring to the paragraph of recent changes which is published in the first issue of the "JOURNAL" of each month.

Personal

Among those who have been added to Roll of the Commission of the Peace for Portsmouth is Mr. THOMAS CARMICHAEL, Deputy-Chairman and General Manager of the Portsmouth and Gosport Gas Company.

* * *

Mr. J. H. BINGHAM, General Manager of Metropolitan Gas Meters, Ltd., and of Cheltenham Meters, Ltd., has been elected a member of the Council of the Institute of Industrial Administration. Mr. Bingham is also Chairman of Council of the Institution of Production Engineers.

* * *

Mr. P. R. DAWSON, at present Technical Assistant to Mr. Thomas Crowdy, Gas and Water Engineer and Manager of the Kendal Corporation, has been appointed to a similar position under Mr. J. Green, Engineer and Manager of the Wisbech Water and Lighting Company. Mr. Dawson served his Articles at the Kendal works, and was appointed Works Chemist in 1934, and Technical Assistant in 1936. He recently passed the Associate Membership Examination of the Institution of Mechanical Engineers.

This is the second movement from Kendal during the past 18 months, the other being Mr. Leslie Wilson, now District Manager of the Watford and St. Albans Gas Company.

Obituary

The death has occurred of Mr. ANDREW MILLER, who for over 40 years was Secretary of Stewarton (Ayrshire) Gaslight Company.

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

An Exhibition of Sound Films of topical interest organized by the Hebden Bridge Gas Committee of the Council was opened on Dec. 15 in the Victoria Hall.

Showroom Sales at Dunfermline during the half-year ended Nov. 15 amounted to £4,238, as compared with £3,034 for the corresponding six months of last year.

A Record Day's Output was recently recorded by the Middlesbrough Gas Department, the total for twenty-four hours reaching 5,382,000 cu.ft., which was an increase on the corresponding day of last year of 10%.

One of the Features at an exhibition held recently by the St. Helens Gas Department was a model gas-works, including a miniature of the Peasley Cross gasholder. Samples were shown of the various by-products obtained from coal.

Mr. W. Barber, Sales Manager of the Stroud Gas Light and Coke Company, addressed the Stroud Rotary Club on Dec. 15. He made his theme the lighter side of the Industry's activities and his humour was greatly appreciated.

The Electric Light in the Council Chamber suddenly failed while the Thornton Cleveleys Council were interviewing applicants for the position of attendant at the gas showrooms. The business proceeded in the dark until the defect was remedied.

The Brixham Gas and Electricity Bill, the principal object of which is to authorize the raising by the local Company of additional capital, was examined and ordered to proceed in the present session of Parliament by the Parliamentary Examiners on Dec. 18.

Sales of Appliances by the Burnley Gas Department during November amounted to 158 cookers, 109 fires, 90 boilers, 154 water heaters, and 26 radiators. The value of sales from April 1 to Nov. 30 was £27,950 against £25,763 in the corresponding period of last year.

Copies of the recently published British Standard Specifications for Domestic Hot Water Supply Boilers Burning Solid Fuel. Part 1, Specification. Part 2, Method of Testing (No. 758—Part 1—1937 and No. 758—Part 2—1937) may be obtained, price 2s. each part, from the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1.

Christmas Fare Cookery Demonstrations were given by Miss Strong, of the Newcastle-upon-Tyne and Gateshead Gas Company's staff, in the Grainger Street demonstration theatre in the past few weeks. These demonstrations were exceedingly popular, a large number of women having attended them regularly, but of all the subjects dealt with cake-icing proved the favourite.

Under the Auspices of the Engineering Public Relations Committee, two Lectures on "Building Big Bridges" by Prof. C. E. Inglis, O.B.E., LL.D., will be given at the Institution of Electrical Engineers on Friday, Jan. 7, and Monday, Jan. 10, 1938, at 3 p.m. Applications for tickets should be made by members of The Institution of Gas Engineers to the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, London, S.W. 1. The Lectures are intended for young persons, mainly for boys, between the ages of fifteen and twenty years.

The City and Guilds of London Institute report on the work of the Department of Technology for the session 1936-37 states that the Institute's examinations at home and overseas were taken in 1937 by 30,070 candidates, a net increase of 3,602, or 13·6%, on last year's total, and 2,865 more than the previous highest number in the history of the Department—recorded in 1911. In Gas Fitting, while there was slight reduction (31) in the numbers taking the Final Grade, there was a net increase of 289 candidates, the total for the subject reaching 2,141 compared with 85 in 1926, when examinations on the general basis of the present scheme were first held.

Expenditure out of revenue of £2,699 for extensions to the coal-handling facilities at Bracebridge Gas-Works has been approved by the Lincoln City Council. The sum of £1,924 is to be expended on extensions to the permanent way, £500 in respect of earth work, and a portable coal-stacker is to be provided at an estimated cost of £275.

The Clitheroe Gas Engineer reports that a large number of ordinary and prepayment gas meters were not being utilized to an extent which justified their retention. It was suggested that a minimum annual consumption of 2,800 cu.ft., or a minimum payment in lieu thereof, at the rate of 10s. per annum (13s. outside the borough) be fixed in respect of each meter. The Gas Committee approved the Gas Engineer's proposals for additional accommodation for his staff, and the provision of a mess-room. Tenders are to be obtained for the work. After considering the annual report, showing a net profit of £953 15s., the Committee have decided to carry this sum to depreciation fund.

Forthcoming Engagements

1938.

Jan.

1.—LONDON AND SOUTHERN JUNIORS.—Visit to the Headquarters of the London Fire Brigade.
4.—I.G.E.—Research Executive Committee, 2.30 p.m.
7.—I.G.E.—Joint Committee on Complete Gasification under Pressure, 3 p.m., at 16, Old Queen Street, S.W. 1.
8.—SCOTTISH EASTERN JUNIORS.—Visit to Milne's Meters, Ltd., Edinburgh.
10.—I.G.E.—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.
13.—MIDLAND JUNIORS.—Meeting and Paper by A. T. Green.
15.—SCOTTISH WESTERN JUNIORS.—Debate meeting.
15.—YORKSHIRE JUNIORS.—Meeting at Leeds. Paper by W. S. Hubbard, "Choice of Gas Storage."
17.—L.C.C.A.—Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.
18.—LONDON AND SOUTHERN JUNIORS.—Meeting and Paper by R. T. d'Eyncourt, "Load Value of Appliances as a Guide to Sales Policy."
19.—B.C.G.A.—Executive Committee, 11.30 a.m.; General Committee, 2.30 p.m., Gas Industry House.
20.—S.B.G.I. Council Meeting, 2.30 p.m.
22.—WESTERN JUNIORS.—Meeting at Weston-super-Mare. Paper by A. G. Holtham, "Rural Gas Services."
27.—MIDLAND JUNIORS.—Visit to Docker Bros., Paint and Varnish Manufacturers, Birmingham.
29.—SCOTTISH WESTERN JUNIORS.—Visit to Glasgow Corporation Lighting Department.

Feb.

2.—LONDON AND SOUTHERN JUNIORS.—Visit to Watson House.
3.—MIDLAND JUNIORS.—Meeting and Paper by G. Bakewell, of Birmingham, "The Sale of Coke for Domestic Purposes."
5.—SCOTTISH EASTERN JUNIORS.—Short Paper Meeting at Dunfermline.
5.—MANCHESTER AND DISTRICT JUNIORS.—Meeting at Blackpool. Paper by T. V. Blake, "A Six Years' Period Prior to the Removal of Blackpool Gas-Works."
12.—SCOTTISH WESTERN JUNIORS.—Meeting and Paper by E. Smith, of Dumbarton, "Stores Control and Job Costing."
15.—LONDON AND SOUTHERN JUNIORS.—Meeting and Paper by E. W. B. Dunning, of the Gas Light and Coke Company, "The Relation of Design to Cooking Quality."

Amalgamation and Grouping

Coatbridge and Airdrie.

The basis of the offer of the Coatbridge Gas Company to purchase the Airdrie Corporation Gas Undertaking is as follows: Payment to Airdrie Town Council of the outstanding loan debt on the Undertaking, believed to be about £20,000 at the date of purchase. Payment of compensation to the officers and employees whose services would not be retained. Provision of gas to Airdrie consumers at Coatbridge rates, subject to the maintenance of differential rates in outlying parts of both areas. Confirmation and granting of the necessary powers by the Board of Trade.

The offer of the Coatbridge Company is based on the assumption that there would be no change for a period of ten years in Airdrie Town Council's attitude towards supplying gas cooking facilities in municipal houses and that for a similar period gas would be retained for street lighting. Failing acceptance of the offer Airdrie Town Council will have to spend some £20,000 on replacing obsolete plant.

United Kingdom and Rossendale.

The shareholders of the Rossendale Union Gas Company have accepted an offer from the United Kingdom Gas Corporation to buy shares of the Company. The Corporation offers for 10% fully-paid ordinary shares of £10, or fully-paid 10% preferred ordinary shares, £21 5s. in cash, or 20 ordinary shares of £1 each in the Corporation *plus* 10s. each. For 7% fully-paid ordinary shares the offer is £14 7s. 6d., or 14 £1 shares in the Corporation and 7s. in cash. Proportionate offers are made for the shares not fully paid.

The Coal Selling Schemes

Criticism of Operation

In *The Times* of Dec. 22 a report is given, as follows, of a meeting of supporters of the Government which was held the previous evening at the House of Commons to consider objections which have been taken to Part III of the Coal Bill in relation to the coal selling schemes. Sir Reginald Clarry was in the chair. The meeting was private, and the following agreed statement was issued at the close:

The President of the Board of Trade and the Secretary for Mines were present at a meeting of Conservative members and others supporting the Government at which the provisions of Part III of the Coal Bill were discussed. Various points were raised indicating the position of particular sections of consumers under the present operations of the coal selling schemes, and the Ministers outlined the Government's attitude to the problems raised.

It is understood that the statements made by Mr. Oliver Stanley and Captain Crookshank for the Government did not wholly satisfy the critics who are dissatisfied with the working of the selling schemes. Among the proposed amendments to the Bill are the imposition upon the coal industry of a statutory obligation to supply so far as possible the quality and quantity of coal required, and that there shall be some limitation of price. The critics of this part of the Bill wish to have it laid down that there shall be no discrimination against customers in the price to be charged for similar coal. It was also suggested that the Committees of Investigation shall have statutory executive authority, or, alternatively, that a new appeal tribunal with power to enforce its decisions shall be set up. A further proposal is that an Advisory Board shall be appointed to safeguard national interests in relation to the working of the schemes and to make recommendations to the Board of Trade.

Complaints were again made last night that industrial consumers could not get sufficient supplies of coal, nor coal of the quality they desire, and that they are sometimes transferred from one colliery to another without regard to their interests. It was urged that amendments should be made which would ensure to consumers the quantity and quality of the coal they needed.

The case for the coal industry was stated in a letter by Sir Evan Williams to *The Times* of Dec. 21. We reproduce this letter below.

To the Editor of *The Times*.

Sir,—My attention has been drawn to an announcement in the Press that a group of Members of Parliament intend to submit to the President of the Board of Trade and the Secretary for Mines certain proposals designed to provide further safeguards to consumers in connection with the statutory coal-selling schemes.

On two of the points which have been raised as matters of major importance the real issue seems to be the policy of the colliery owners and of the sales control bodies in administering the schemes, and it may perhaps be helpful if I give a short explanation of their point of view.

The first suggestion is that the coal industry shall be under a statutory obligation to supply as far as possible the quantity and quality of coal reasonably required by consumers. Allied with this is the claim that consumers should be entitled, if they so desire, to change the source of their supplies.

On this I can say at once, not only that it is already the definite policy of the coalowners to endeavour to meet all reasonable requirements on the part of consumers both as to quantity and quality, but that we are quite ready to give to the Government an assurance that where a consumer desires to change his source of supply for good and sufficient reason—other than a question of price—the sales control bodies do not and will not place difficulties in the way of the issue of permits for the coal desired if it is available. It is only in cases where it may be evident that consumers are attempting to set off one colliery against another in the matter of price that steps must necessarily be taken to prevent this if the objects of the Coal Mines Schemes are to be carried out.

The second of the proposals of the Parliamentary group which, I think, calls for an explanation of the coalowners' attitude is that the selling organizations should be under a statutory obligation to show no undue preference to any consumer or class of consumer.

If this meant that all classes of consumers must, whatever the circumstances, have the right to the supply of a particular description of coal at the same price it must be pointed out in the first place that there are large and important bodies of consumers who would dissent from that doctrine. There are industries exposed to the effects of foreign competition in which coal costs form a material part of the cost of production and which in times of difficulty expect their circumstances to be taken into consideration by the coal industry with a view to the retention of the markets for their goods and the maintenance of their demand for coal, and it seems to us that from the point of view of the national interest in the broadest sense we must not be precluded from considering a situation of this kind.

At the same time I can say quite definitely that "undue preference" is neither the policy nor the practice of the sales control bodies. In support of this statement I may mention that since the inception of the selling schemes about a dozen complaints of undue discrimination have been made by consumers before the Committees of Investigation, and that in each case the Committee, after receiving from the coalowners the fullest information, including particulars of their contracts with other consumers, reached the decision that there had been no undue discrimination.

In conclusion, I would draw attention to the fact that the average price of coal, as recorded in the official quarterly summaries of the Mines Department, only shows an increase of about 1s. per ton over that of last year and of 2s. per ton over the average price during the depressed period of 1933. The greater part of this has gone in increases in wages and also in increases in prices of materials, the full effect of which has not yet been felt, and I would venture to submit that this is evidence of the moderation with which the industry has exercised its powers under the Coal Mines Schemes.

I am, Sir, your obedient servant,
EVAN WILLIAMS,
Chairman.

Central Coal Mines Scheme, 1930, Central Council, General Buildings, Aldwych, W.C. 2, Dec. 20.

Sheffield Gas Company

Bill to Extend Area

At an extraordinary general meeting of stockholders of the Sheffield Gas Company on Dec. 23 sanction was given to the promotion of a Bill in Parliament to authorize a change of name and to extend the area of collection of coke oven gas to include parts of the West Riding of Yorkshire and some Derbyshire and Nottinghamshire rural areas.

Retford Rural District Council has decided to oppose the Bill so far as it concerns parishes in the Retford district.

Air Raid Defence Finance

Position of Essential Public Utilities

In the House of Commons on Dec. 23 Sir W. Davison asked the Secretary of State for the Home Department whether he was yet in a position to make any statement as to the grant of financial assistance by the Government to public utility undertakings in respect of air-raid precautions plans.

Sir S. Hoare replied that the Government had been considering the position of certain essential public utility services, the continued functioning of which was essential in wartime. The exceptional position of the industries

concerned placed upon them a special responsibility for doing their utmost to ensure continuity of service in all circumstances, including those of war. These industries would have to incur considerable expenditure on the measures necessary to ensure continued functioning in wartime; and the Government had accepted the principle of a contribution towards expenditure of this nature on precautions additional to those falling on industry generally. The actual details of any such arrangement had to be worked out in close consultation with the undertakings concerned. These consultations would begin as early as practicable in the New Year.

What is a Gas Jet?

In the *Daily Mirror* of Dec. 21 we read the following:

> Free Christmas presents are believed to have been secured by Margate shoppers under cover of a "black-out" due to an electricity failure last night.
>
> Lights went out suddenly over the entire town, and the "black-out" lasted more than an hour.
>
> Street lamps were not affected, being lighted by gas jets, but shops in the main streets were plunged into darkness and business was brought to a standstill.

Actually the "black-out" was at Ramsgate, not at Margate, and the "gas jets"" which did such yeoman service on the occasion in question consisted of a very fine installation of Keith-Blackman high-pressure lamps—an installation of which Mr. R. H. Ruthven, Engineer and Manager of the Ramsgate Gas and Water Department, is justly proud. Electricity is not used for street lighting in Ramsgate.

Glasgow and Coke Oven Gas

Fixed Price Preferred to Sliding Scale

The offer of Messrs. William Dixon, Ltd., to supply Glasgow Corporation with coke oven gas from their ironworks at Polmadie was considered at a meeting of the Gas Sub-Committee on Works and Distribution and representatives of the firm on Dec. 16.

A number of points raised by the town councillors was discussed, and to enable the firm's representatives to consider these and to lay further information before the committee it was agreed to adjourn the business till another meeting to be held at the earliest convenient date. One of the points made from the committee side at the meeting was that the proposed sliding scale meant that the price at which the gas is offered is not now 5½d. as originally quoted but 6½d. per 1,000 cu.ft. It was indicated that a definite fixed price to apply to a contract term of 10 years or longer might be preferable to the Corporation rather than a sliding scale price. The suggestion was made that increases in coal prices would be largely offset by the increase in values which usually accompany such a movement, and that in view of that condition the industrial producers should be able to quote a uniform price for the gas over a period of years. The question of whether the firm can make such an offer is one of those which is to be examined before a further meeting is held between the negotiating parties.

Western Juniors at Trowbridge

Works Visit and Meeting

On Dec. 11, members of the Western Junior Gas Association visited Trowbridge, where they were welcomed by Mr. J. V. Knight, Engineer and Manager of the Trowbridge Station of the British Gas Light Company. Those interested in gas manufacture were shown round the Works, where they saw plant which was the subject of a Paper subsequently read by Mr. V. J. Borrett, which will be found on other pages of this issue. Members on the distribution and sales side were shown the compressors supplying Bradford-on-Avon and a plant recently installed for drying corn before milling.

The visitors were subsequently entertained at tea at the George Hotel on the kind invitation of the Directors of the British Gas Light Company, who were thanked on the proposition of the President, Mr. J. E. Akroyd (Swindon, G.W.R.).

Principles of Chemical Engineering*

This work was first published in 1923 and the second edition appeared in 1927. In a Preface to the present edition Messrs. W. H. McAdams and E. R. Gilliland point out that the last decade has been characterized by the introduction in the chemical industry of a large number of new processes and by important modification and refinement of old ones. These changes have made the practice of chemical engineering more complex, and there is more need than ever for the presentation of fundamental conceptions in the clearest possible way. The purpose of revision is to meet this situation. The most extensive changes are in the chapters on Flow of Fluids and Flow of Heat, and in those involving diffusional processes. In Flow of Heat there is a discussion of the mechanisms of convection, and the problem of mean temperature difference has been expanded, and the treatment of radiation enlarged. The chapters on absorption and extraction, distillation, and air condition have been modified, and the discussion on Filtration has been rewritten. The chapter on Drying presents new data and developments in recent years.

* "Principles of Chemical Engineering," by W. H. Walker, W. K. Lewis, W. H. McAdams, and E. R. Gilliland. Third Edition, revised and rewritten. Published by the McGraw-Hill Publishing Company, Ltd., Aldwych House, W.C. 2. Price 30s. net.

Athletic and Social

Oxley's Staff Party.

The annual Christmas party of the staff and workmen of the Oxley Engineering Company, Ltd., was held on the evening of Dec. 23, at which members of the firm gave a most original and enjoyable entertainment. During the evening a feature was the rendering of a song specially composed by members of the staff.

Ascot's Staff Party.

There were some 1,500 persons present at the Annual Christmas Party on Dec. 23 of Ascot Gas Water Heaters, Ltd. It was held in the Porchester Hall, Bayswater, which was attractively decorated for the occasion. Many prizes were presented for "spot" dances, while presentations were also made to Dr. Bernard Friedman, the Managing Director, and to other members of the staff. The evening was enlivened by a "hidden talent" competition, in which members of the staff presented variety "turns" on the stage, adjudged by the volume of applause accorded to each.

In the course of the evening Dr. Friedman extended a very warm welcome to those present and said it was due to their efforts that the firm had achieved the success it had. He referred briefly to the new canteen which was being built at Neasden, and the details he gave showed that it will certainly be one of the most up-to-date of its kind, including accommodation for 400 persons, with a radiogram and television set and a "talkie" cinematograph installation.

Tate's Staff Dinner and Dance.

Much of the work of Tate & Co. (London), Ltd., goes ahead quietly and steadily on the district without the rest of the world hearing a great deal about it—until the firm's Social and Sports Club organize such a function as their Annual Staff Dinner and Dance which was held in London last Friday. And on such a festive occasion they may be excused for proclaiming what they had been doing, for it is something of which they may well be proud.

We described in the "JOURNAL" for Sept. 23, 1936, the kind of service which Tate's set out to provide for the Gas Industry, and when the figure of over a quarter of a million pounds worth of gas appliances sold during the year is mentioned it will be appreciated that their sales service is no idle boast—as a number of gas undertakings have discovered to their considerable advantage.

Some 350 members and guests assembled at the Criterion Restaurant, Piccadilly, where they were received by Mr. H. E. T. Read, the General Manager. Among the visitors were a number of representatives of gas undertakings with whom the firm co-operate.

The toast of "The Company" was proposed by Mr. R. W. Lowman (Gas Sales Manager to the Gas Light and Coke Company), who referred to the phenomenal growth

of the firm's activities since the idea of co-operating with the Gas Industry was first mooted in connection with the refrigerator campaign in 1934. Since then the firm has extended its scope to all other classes of domestic gas appliances. Mr. Lowman paid tribute to the work of Mr. LeFevre in connection with the training of Tate's sales staff at Watson House, and, in conclusion, he coupled the toast with the name of Mr. P. E. Bunt (Chairman of the firm) and wished them all prosperity in the future. In responding to the toast, Mr. Bunt took the opportunity of thanking the executives of gas undertakings for their support and also expressed appreciation of the excellent leadership of Mr. Read. His remarks were accompanied by a number of presentations to members of the sales force who had achieved outstanding results during the year. Perhaps it was appropriate that the laurels should have gone to a lady member of the sales staff, who achieved the remarkable turnover of £50,000 worth of gas appliances. Other awards included sports trophies, while a presentation was also made to Mr. Read, who proposed the toast of "Our Guests." In doing so he referred to the fact that they had accomplished their quota of a quarter of a million pounds, and next year they were aiming at an even larger figure. He recorded their thanks to Watson House for training their sales personnel.

Mr. N. D. Hennessy responded to the toast, and the remainder of the evening was given over to dancing and cabaret entertainments.

London and Counties Coke Salesmen's Circle

The Annual General Meeting of the London and Counties Coke Salesmen's Circle was held at Gas Industry House on Wednesday, Dec. 15—Mr. J. GRAYSTON, of Romford (the Chairman), presiding.

The HON. SECRETARY (Mr. F. A. Haddock) read the notice convening the meeting, after which the minutes of the previous Annual General Meeting, as circulated to members, were taken as read and confirmed.

THE CHAIRMAN'S ADDRESS.

In the course of his Chairman's Address, Mr. GRAYSTON referred to the activities of the Circle during the past session, particularly their summer visit to Messrs. Crane, Ltd., of Ipswich. Regarding the nature of the work of the session, Mr. Grayston went on to say:

"We have had during this year two very eminent Papers both devoted to the development of coke utilization upon strictly scientific lines, and, of necessity, the Papers have had a distinctly specialized tendency. If I may say so, they have not been very discussable Papers, because by their very nature they were dealing with fundamental facts which are not really open to debate. But I would ask you to remember that these Papers have been given primarily for their educational value, or in the words of our Constitution 'to promote the technical knowledge of members.' The individual coke salesman who possibly has to participate in every branch of coke sales operating in his own Company, probably has very little time to devote to a detailed study of thermostatic control, for example, but without some knowledge of the subject, its applications, effectiveness, and limitations, he is falling short of being 'The Compleat Coke Salesman.' Without this knowledge there are certain doors which will always be closed to you, certain potential markets to which you will have no *entrée*. We have each one of us to be able to acquaint our clients with the best and latest which technical development can offer. Our commodity must be introduced to the customers through these channels; after the introduction if the problem is too specialized for us, we have behind us the resources of our parent body.

"It has been said to me quite recently that at the present time there are no problems and no difficulties in the selling of coke, so much is the demand in excess of the supply. So far from the truth is this statement that I would like to suggest that here is the very kernel of the problem. We have to sell and utilize coke to such advantage that we can make one ton of coke do the work of two. This is the guarantee of permanency for the present demand and can only be attained by following the plough of scientific attainments and achievements. These remarks are applicable to a variety of subjects all of which demand our attention. It has been the aim of your Committee to make this essential information available in the most comprehensive form possible. You will be interested to learn that Mr. L. H. Ardley's recent Paper on 'Thermostatic Control' has been reprinted by the London and Counties Coke Association in brochure form fully illustrated to meet a widespread demand for information on the subject—a compliment to the Author and this Circle.

"During the session there has been a further forward step made in this aspect of the Circle's work. I refer to the circulation of the monthly reports of the Technical Committee, and it must be gratifying to our parent body to know that these reports are extremely valuable to the coke salesmen individually, who are, in my opinion, the people most directly concerned with and able to benefit from the information made available. During the session your Committee has made certain attempts to compile an annual bibliography of technical Papers relating to coke; there is a pressing demand for this, but the practical difficulties as yet have not been solved.

"After looking at the work of the Circle from within in order to see what has been done, I would like you now to look at the Circle from the outside to see, if possible, what has not been done. The effective sale and utilization of coke has assumed a position of importance within our Industry second only to gas, and this Circle is the first body constituted to improve its selling technique. The growth and increasing development of coke markets throughout the country indicate that in due time other bodies having similar objects to our own will be formed. We look forward to such development, and, I hope, to active co-operation with any Coke Salesmen's Circle which may come into operation. There are certain other bodies in being whose interests are running parallel with our own and I would like to suggest that it would be of distinct mutual benefit if ways and means could be found for a joint meeting with these organizations. I feel that a gap could be bridged and many useful purposes fulfilled by discussions in which we could meet either the Gas Salesmen's Section or the Coke Distributors' Branch or both.

"There are many knotty problems which might be approached with a spirit of co-operation in order to learn from our colleagues their experience and opportunities in the field of consumer service. This would be breaking new ground for the Circle, but it is not without an established precedent as our parent body is already a party to an effective agreement to promote an interchange of information on prospective central heating business."

Election of Officers and Committee.

The following Officers and members of the Committee were unanimously elected for the year 1938—namely:

President.—R. W. Foot (Chairman, L.C.C.A.).
Chairman.—J. Grayston (Romford).
Vice-Chairman.—B. H. Almond (Watford).
Hon. Secretary.—F. A. Haddock (L.C.C.A.).
Committee.—F. C. Ashley (Gas Light and Coke), W. Johnson (Wandsworth), H. W. Kerridge (Croydon), H. E. Lethbridge (Tottenham), H. W. Lovell (Ipswich), F. E. Pye (Barnet), and (*ex-officio* member) W. L. Boon (General Manager, L.C.C.A.).

Mr. R. SUMMERSON (Luton) proposed and Mr. J. R. BROMHEAD (Lea Bridge) seconded a vote of thanks to the retiring members of the Committee—Mr. F. J. Laws (Tottenham) and Mr. W. A. Smith (Gas Light and Coke)—for their work for the Circle, which had been greatly appreciated. Mr. LAWS briefly acknowledged the expression of thanks on behalf of Mr. Smith and himself, remarking that it had been a pleasure to do what they could to forward the work of the Circle.

A cordial vote of thanks was also passed to the President, Chairman, and other officers on the proposition of Mr. BROMHEAD, seconded by Mr. F. W. FREETH (Southampton), which was duly acknowledged by the CHAIRMAN and the HON. SECRETARY.

The meeting concluded with tea and an hour devoted to "Question Box," in the course of which a number of subjects were discussed in detail.

British Sulphate of Ammonia Federation

Extract from Annual Report for 1936-37

The following figures are offered as fair estimates, but strict accuracy is not claimed for them. The estimates for 1934-35 and 1935-36 have been slightly revised. The percentage increases or decreases as compared with the previous year are shown in italics.

World Production and Consumption of Pure Nitrogen for the Fertilizer Years.

[In Thousands of Metric Tons.]

Production.	1934-35.	1935-36.	1936-37.
Sulphate of ammonia—			
By-product	321	376	407
Synthetic	533	630	654*
	854	1,006	1,061*
Cyanamide	232	269	285*
Nitrate of lime	153	156	159*
Other forms of nitrogen†—			
Synthetic	607	724	843*
By-product	45	46	40
Chile nitrate	179	192	206
Total production	2,070	2,393	2,594*
Percentage increase or decrease	*+ 15·5*	*+ 1·56*	*+ 8·4*
Consumption—			
Manufactured nitrogen	1,877	2,201	2,433*
Chile nitrate	195	216	242
Total consumption	2,072	2,417	2,675*
Percentage increase or decrease	*+ 10·3*	*+ 16·7*	*+ 10·7*
Agricultural consumption about	1,812	2,084	2,344*
Percentage increase or decrease	*+ 8·3*	*+ 15·0*	*+ 12·5*

* Highest figure ever reached.

† Including nitrogen products used for industrial purposes (except Chile nitrate) and ammonia in mixed fertilizers.

NOTE.—Fertilizers are included in these tables under the final form as sold, so that, for example, cyanamide if converted into sulphate of ammonia is included under synthetic sulphate of ammonia, or, if into ammophos, is included under other synthetic nitrogen.

During the year under review it is estimated that there was an increase of 201,000 metric tons of nitrogen, or about 8·4%, in the actual production of the forms of nitrogen enumerated above. The production in Chile increased by 14,000 tons, or 7%, and output in other countries increased by 187,000 tons, or 9%. As indicated by the asterisks, 1936-37 was a record year for the output of most of the products shown.

As in the previous year, the most marked increases in manufactured nitrogen output have been in Germany, Japan, and the U.S.A.

Synthetic nitrogen plants have on an average operated at only about 50% of capacity during the year; the world production capacity for synthetic nitrogen, including cyanamide, is estimated at 3,900,000 tons of nitrogen.

The total consumption increased by 258,099 tons, or about 10·7%, following an increase of 16·7% last year.

The increase in fertilizer nitrogen consumption was 261,000 metric tons, or 12·5%, as compared with 15% in the previous year. Each main class of fertilizer showed an increase; ammonium sulphate (including ammonia for mixed fertilizers) increased by 130,764 tons of nitrogen, or 12·9%, over the 1935-36 figure.

The order of importance in the production and consumption of nitrogen for agricultural use remains roughly as in recent years—viz., ammonium sulphate, 47-49% of all fertilizer nitrogen; cyanamide, 11-13%; Chile nitrate, 9-10%; lime ammonium nitrate (" Nitro-chalk " forms), 8-9%; calcium nitrate, 7-8%; sodium nitrate (for fertilizer), 3-4%; and other synthetic nitrogenous fertilizers, 9-12%.

Home Production.

Home consumption of sulphate of ammonia showed an increase on the 1935-36 figures of 6,300 tons, or 2·9%, following an increase of 4·9% in the previous year. Prices were the same as in the two previous years. The increase in the consumption in Scotland was 9·8% and in Ireland 6·2%, but in England and Wales there was a slight decline of 0·5%.

The total consumption of pure nitrogen in the British Isles for all purposes amounted to about 95,100 metric tons against 91,800 tons last year, an increase of 3·6%. The tonnage used in industry is estimated at 29,100 tons, against 28,800 last year.

The figures in the following table showing the total production of ammonia products, expressed as sulphate, are calculated on the basis of 25% ammonia (about 20·6% nitrogen). The figures for sulphate of ammonia production, however, apply to actual tons of product with a nitrogen content varying from an average of about 20% in the earlier years to about 21% in recent years.

Production of Ammonia Products and of Ammonium Sulphate in the British Isles.

[Tons of 2,240 lb.]

Calendar Year.	Total Production of Ammonia Products, Expressed as Sulphate of Ammonia Equivalent (Basis 25% Ammonia).*				Included in the Total.	
	England and Wales.	Scotland.	Ireland.	Total Great Britain and Ireland.	Industrial Ammonia Products (Basis 25% Ammonia) about	Sulphate of Ammonia as such (actual Tons of Product) about
1934	560,526	45,522	3,961†	610,009	112,400	448,500
1935	560,835	47,650	4,064†	612,549	113,500	448,300
1936	562,380	49,703	4,006†	616,089	117,500	426,700

* 25% ammonia = 20·6% of nitrogen (approx.). The figures for total production of ammonia products are recalculated from the Alkali Inspectors' Reports, except for the estimates shown. Estimates for Ireland have been included.

† Estimated.

Total exports of ammonium sulphate from Great Britain and Ireland show an increase of 44,414 tons or about 22% on last year's figures.

World Export Trade in Sulphate of Ammonia.

The following table shows the excess of exports over imports of sulphate of ammonia during the last seventeen calendar years, expressed in metric tons of nitrogen, for all countries having a surplus in any year:

Balance of Exports of Ammonium Sulphate.

[In Metric Tons of Nitrogen Calculated at 20·6%.]

Calendar Year.	Balance of Exports from—					Total.
	Great Britain and Ireland.	United States (*a*).	Germany.	Other European Countries (*b*)	British Empire Countries (*c*)	
1920	22,832	12,050	5,346	197	6,759	47,184
1921	26,163	20,498	2,385*	473	5,323	54,842
1922	29,862	29,804	2,443	1,532	3,930	67,571
1923	51,588	31,423	24,489	4,810	4,835	117,145
1924	54,764	23,518	21,323†	2,904	5,290	107,799
1925	51,736	20,800	100,903†	2,201	4,728	180,368
1926	30,252	34,680	138,057†	3,233	3,647	209,869
1927	52,405	25,438	137,770†	1,918	4,371	221,902
1928	78,824	10,663	172,426†	5,591	2,292	269,796
1929	120,381	26,310	149,680†	13,666	4,255‡	314,292
1930	111,757	10,021	86,298†	36,814	1,605‡	246,495
1931	78,281	..	125,878†	51,010	..	255,169
1932	81,062	..	77,238	98,671	5,136‡	262,107
1933	61,457	..	91,872	72,381	11,995‡	237,705
1934	56,274	..	73,982	74,681	8,720‡	213,657
1935	47,443	..	90,059	95,513	7,620‡	240,635
1936	38,665	..	83,933	85,067	14,970‡	222,635

* May to December only.

† Including reparations deliveries.

‡ All from Canada.

(*a*) Not including exports from U.S.A. but including imports from other countries to the non-contiguous territories of Alaska, Hawaii, and Porto Rico.

(*b*) Poland, Belgium, Holland, Czecho Slovakia, Italy, Sweden, Norway, Austria, Hungary, Roumania, and Russia.

(*c*) Canada, Australia, India, S. Africa, and New Zealand.

Grass Drying.

Increasing interest is being shown in grass drying. There were 94 grass drying plants in operation in 1936-37 as against 50 in the previous year. The Agricultural Research Council has been actively engaged in investigating further the economics of production and maintenance of grass and fodder crops for drying. The grassland campaign which the Government have commenced in connection with the Land Fertility Scheme should serve to quicken interest in grass drying and kindred methods of fodder conservation, which represents a great potential market for the increased use of fertilizers.

The list of members at June 30, 1937, recorded a total of 205 members, a reduction of 1 from that of the previous year, due to an amalgamation in India.

Works Extensions at Trowbridge

by
V. J. BORRETT,
of the Trowbridge Gas Company

From a Paper read before a meeting of the Western Junior Gas Association held at Trowbridge on Saturday, Dec. 11—under the Presidency of Mr. J. E. AKROYD, of Swindon (G.W.R.).

The increasing demand for gas at Trowbridge in the years since the war has necessitated considerable modernization and extension of the plant on the Works. In addition, it was decided in 1933 to give a bulk supply to the Bradford-on-Avon Gas Company (a Subsidiary Undertaking of the British Gas Light Company) which meant an increase of about 30% on the Trowbridge output.

To enable this to be done an extensive programme of Works reconstruction had to be undertaken. Much of this work was carried out under very difficult conditions owing to the rather congested nature of the Works. The yard is on two distinct levels, most of the original plant being on the lower level. New plant, and that which had to be moved, had to be fitted into existing buildings there being no new buildings erected.

The result of the amalgamation with Bradford has reduced the cost of gas into holder at Trowbridge from 1s. 9·86d. to 1s. 6·8d. per 1,000 cu.ft., or from 4·37d. to 3·77d. per therm. The declared calorific value is 500 B.Th.U. The reduced overhead charges have been largely accounted for by the fact that labour charges are practically the same as they were prior to the amalgamation.

A point of interest with regard to the coke question and amalgamations is their contribution to the general coke shortage. Gas being more economically produced tends to reduce the quantity of coal carbonized with the consequent decrease in the quantity of coke made. We have about 80 tons in stock compared with 480 this time last year. This difference, however, is not due entirely to the above conditions as we have a good sale for coke.

In 1923, the increasing demand for gas was beginning to tax the capacity of the hand-charged settings to the full which made consideration of extension imperative. The result was that machine stoking was introduced. Some of the hand-charged settings were demolished and five settings, each of six 24 in. by 16 in. " D " retorts 16 ft. long erected, capable of an output of 375,000 cu.ft. per day. Working of the remaining hand-charged settings was discontinued. The installation included a Guest-Gibbons machine which discharges coke on to a De Brouwer conveyor and charges the retort with 10 cwt. of coal in three movements, the carbonizing time being 12 hours.

To meet the steadily increasing demand for gas, and at the same time to make provision for supplying Bradford, the plant was extended in 1934. The type and position of plant to be installed was carefully considered, and in view of the existing arrangement, it was decided that the most economical installation would be to add three similar settings to the existing five settings than to adopt an entirely new type of plant. These settings were constructed by Messrs. Gibbons Brothers. Centre screw mouthpiece lids are fitted, and the gas offtake arrangement is by the Congdon standpipe system. From the satisfactory working of this system at our King's Lynn Works it was decided to adopt the same at Trowbridge where it has given similar satisfaction.

The furnaces of these settings are of the step grate type. The saving in the cost of firebar replacement is a great asset in favour of this type of grate. The fires are also more easily cleaned. Clinker formation is considerable, however, and although we use all Somerset coal, I think our trouble with clinker is largely due to none too generous a depth of furnace. A full fire would be about 4 ft. 6 in. deep, and towards replenishing time—*i.e.*, every six hours—something like direct fired conditions prevail with the consequent fusing of the ash. Our carbonizing results show 70 therms per ton, coke made per ton 12½ cwt., and coke used in furnaces 3 cwt. per ton of coal carbonized.

The plant was put to work in October, 1935. Our coal gas plant has now a capacity of at least 600,000 cu.ft. per day with the maximum day's output standing at 660,000 cu.ft. We have seven beds at work at the moment owing to the low coke stock. Normally we should have six at work with water gas.

Carburetted Water Gas Plant.

Humphreys & Glasgow carburetted water gas plant with a daily capacity of 250,000 cu.ft. c.w.g., or 200,000 cu.ft. b.w.g., was erected on the site of old meter stores and cooker shop. The plant is of the hand-operated type, details of which are no doubt familiar to you. The building is steel framed, brick panelled, and designed to house a duplicate set. Later, the set was altered to the back run process, increasing its capacity to 400,000 c.w.g. and 320,000 b.w.g. The following figures show the working results before and after this alteration:

	Gas Made per Hour.	Coke per 1,000 Cu.Ft.
Before	6,800 cu.ft.	44 lb.
After	12,100 ,,	43·4 ,,

To reduce the number of complaints on the district due to rust and water in service pipes, a Holmes " Dri-Gas " plant was erected, and the great reduction in the number of complaints now received has fully justified the expenditure.

The calcium chloride has to be replenished from time to time, and the cost of this since the plant was first put to work amounts to 1s. 6d. per million cu.ft. treated, 0·018d. per 1,000 cu.ft., or 0·0036d. per therm. Cleaning, oiling, and repairs amount to 1s. 7d. per million cu.ft. treated, 0·019d. per 1,000 cu.ft., or 0·0038d. per therm.

Naphthalene is reduced to about 1 to 2 grains per 100 cu.ft., using gas oil, at the rate of about 20 gallons per million cu.ft. Normal pressure given by the combined plant is about 7-tenths, and its capacity is ½ million cu.ft. per day.

Boosting Plant.

A fan type booster with a capacity of 60,000 cu.ft. per hour giving a differential pressure of 10 in. w.g. was installed to raise pressures at Holt, a village 2½ miles away, and, incidentally, to help town pressures.

Pressures can now be adequately maintained in all parts of the district. The booster is driven by Tex-rope drive from a National gas engine; an electric motor has recently been installed as a standby.

A Waller Retriever pan ash separator has been installed, and the reclaimed fuel is useful to mix with the breeze used for boiler fuel. The plant is belt driven by a horizontal steam engine situated in the retort house. The increased output in 1924 necessitated increasing the purifying plant, and one of the old type water lute boxes was replaced by a new 16 ft. square dry lute box which is in use to-day on a new site as a catch box.

It was realized in 1933 that the plant would be totally inadequate to deal with the extra gas made when the Bradford Works were shut down, so a completely new installation on a site at the rear of the Works was decided upon. This comprises four boxes 20 ft. square and 5 ft. deep, each holding 30 tons of new oxide on four tiers. Reversing valves are fitted for upward or downward flow. Owing to considerable condensation the downward flow is worked for three weeks and upward flow for one week. The boxes are of the luteless type with rubber joints, and have 16 in. connections.

Air for revivification is admitted at the exhauster inlet. A Whessoe heater is installed in the inlet main, the outlet temperature being kept at about 75° to 80° F.

Supply to Bradford.

In the autumn of 1935 we were in a position to supply Bradford with gas. The main had been laid by Messrs. W. Press & Sons; it is 6 in. steel with welded joints tested to 30 lb. per sq.in.

On Oct. 23, 1935, one compressor was started up and a full supply was delivered into the Bradford holder. To prevent over-filling of this holder the inlet valve is automatically operated by the holder as it rises and falls. One end of a wire rope is attached to the valve spindle, the other end is attached to a weight which rests on the *curb* of the outer lift. A counterbalance weight is also fixed on the valve spindle. This weight with the spindle is pulled up when the holder falls and the valve opens. The reverse occurs when the holder rises.

At a predetermined height the valve is closed. The pressure in the main then increases to the point when it is

equal to the loading on the automatic by-pass governor situated near the compressors, which is 2 lb. sq.in. This governor then opens and the pressure of 2 lb. is maintained by allowing gas to return to the inlet of the compressor.

A reducing governor in the new governor house at Bradford brings the pressure down to 6 in., and the gas is then measured by a rotary meter before passing into the holder. When the compressor is not working, a flap valve is raised at Trowbridge, and about 3,500 cu.ft. per hour passes to Bradford by holder pressure alone, which is sufficient for off-peak periods.

Incidentally, our new holder which is in course of erection will give 12 in. pressure, and this will considerably reduce the time which is now necessary for the compressor to be at work. The Bradford holder which gives 5 in. maximum is in need of repair, and the extra holder pressure at Trowbridge will probably enable it to be by-passed at certain hours.

Tower Scrubber.

Mention might be made of experiments done by Messrs. Milbourne and Franks with a view of improving the efficiency and capacity of the Walker tower scrubber.

If this could be done, it would probably save an expenditure of about £650 on a new rotary washer. Up to this time the scrubber was filled with wood grids 6 in. in depth. The water was sprayed by two revolving arms driven by gearing from steam engine. The spray by this method was in a very coarse form, and it was suggested that if water were "atomized" to a very fine mist in the upper part, the efficiency for ammonia and tar fog extraction would be increased. The water is, therefore, "atomized" by means of purified gas at a pressure of 5 lb. per sq.in., supplied by the small compressor in the engine room, in seven specially designed sprays fixed in the crown of the scrubber. Placing them 5 ft. apart up the side of the scrubber was not a success.

For the purposes of the experiments, the original wood filling was completely removed, and large coke substituted to a depth of 14 ft., the remainder being free space. The performance of the plant in removing tar fog and ammonia were both tested. The tar fog varied at the inlet, and was dependent upon the performance of the Cockey washer immediately preceding it.

Result of Test 1 (*with Sprays at work*)—
Average tar fog at inlet was 9·6 grains per 100 cu.ft.; outlet was 3·5 = 63·5% extraction.

Test 2 (*with Sprays shut off*) the figures were:—
Inlet, 12·5; outlet, 8·0 = 36% extraction.

The coke filling was, therefore, extracting more than half of the tar fog.

With regard to ammonia, the condition of the coke filling at the time of the testing was not good for its removal. The scrubber was giving 2 in. of pressure as against less than ½ in. when the coke was first put in. There was also present a tarry sludge of naphthalene and breeze, which might have affected the degree of wetting of the coke surfaces. The "slip" in the scrubber as a whole was 26·7%, in the spray space it was 72·3%, and in the coke column it was 36·7%.

It was evident that most of the ammonia was being removed in the coke column, and very little extracted in the spray chamber. The spraying device might have been an efficient distribution of water for a short distance down through the coke, but after that the degree of wetting must have been very low for the "slip" in the coke column to have been so high. Possibly, the dirty condition of the coke made wetting more difficult to achieve.

Since the tests were made the coke filling has been entirely replaced by wood grids 3 in. in thickness, and it is hoped to carry out further tests at some time. The water used was 14½ gallons per ton of coal carbonized.

Coke Handling Plant.

With the introduction of machine stoking in 1923, mechanical handling of coke was also installed, the coke being conveyed by a De Brouwer conveyor out of the retort house to a 28-ton hopper. After ten years' use the chain and cast iron trough plates required renewing.

To meet a growing demand for broken coke, a small Cort's coke breaker driven by belt from steam engine was installed. Bradford being supplied with gas, our increased output of coke made it necessary to consider improving coke handling facilities. Much labour was required in summer time to stack the surplus coke. Moreover, with the extended use of broken coke the demand exceeded our capacity to supply promptly. Eventually, a modern coke-grading plant was erected and put to work in January, 1937.

The coke is conveyed by belt from the old hopper to the new plant, where it is broken and graded into three sizes—viz., 0 in. to ½ in., ½ in. to 1¼ in., and 1¼ in. to 2½ in. The breaker and screens are of the Nelson and Zimmer types, respectively. The hoppers are of 15, 30, and 45 tons capacity; these are brick built, and the sloping bottoms are lined with 1 in. tiles.

The plant was erected by Messrs. Aldridge & Ranken, Bath.

New Holder.

A 3-lift spiral guided holder of 314,000 cu.ft. capacity is being erected by Messrs. E. Cockey & Sons, Frome, in steel tank which rests on a reinforced mass concrete foundation.

The 18-in. inlet and outlet connections are being arranged and will terminate diametrically opposite in the holder. This will be a great improvement on the existing holder. In this the pipes are adjacent, and variations in the quality of the inlet gas soon show on the town gas when the demand is heavy and the holder is not full.

New Laboratory Testing Room and Garages.

It was decided to build a new laboratory and testing room adjoining the new garages which have been recently built for our various trucks and Sentinel steam wagon.

For bringing coke breeze to the boilers we have a truck designed by the Abtus Permanent Way Equipment Company. It has direct front wheel drive, and reverse drive is obtained by completely turning the front wheels. It has a platform type body, with a specially designed removable tipping hopper. A full load of breeze weighs 25 to 30 cwt. It is a very sturdy machine and has proved very satisfactory.

One other machine is a Crone & Taylor oxide disintegrator, driven by a 2 h.p. horizontal twin Petters engine. We have found this of great advantage in dealing with hard lumps of oxide, and also labour-saving when handling the oxide.

In conclusion, Trowbridge is a small Works, but I am proud to say that the policy of my Company is one which recognizes the great importance of the small Works for the well-being of the Industry as a whole, by modernizing and keeping up-to-date those they have acquired. The corollary to the slogan "Get Up-to-Date with Gas" must be "Get Up-to-Date with Plant."

New Showrooms at Thetford

British Gas Light Company's Enterprise

The new offices and showrooms of the British Gas Light Company, Ltd., in King Street, Thetford, were opened by Sir William Gentle on Dec. 14. Following the opening ceremony the Company entertained a representative gathering to luncheon in the Guildhall, Mr. Henry Woodall, Chairman of the Company, presiding.

Mr. Woodall, replying to the toast of the Company, proposed by Sir William Gentle, said they had now had some experience of the new management which he hoped had not given less good service than that to which they had long been accustomed. They were fortunate in being able to retain the services of Mr. L. C. B. Williams as Manager. The new showrooms showed that the Company was anxious to take its place in their community and that they had shown a proper respect for the amenities and architecture of that ancient and most interesting town. The British Gas Light Company was 112 years old, controlling altogether 39 undertakings, 15 of which were in Norfolk.

Mr. Harold G. Palmer, Director of the British Gas Light Company, proposed "Our Guests," to which the Mayor of Thetford responded.

The Chairman having called upon Sir Reginald Neville for a few words, Sir Reginald said he had been connected with the Gas Industry for 45 years. He referred to the difficulties with which the gas companies had to contend in their earlier days, but now Parliament had put them on a better footing. All the gas companies asked was a fair field and no favour; they did not fear competition. The Company's new showroom was one of the best of its kind he had seen.

French Gas Industry

Review of the 60th Congress of the Union Syndicale de l'Industrie Technique du Gaz en France

Continued from p. 939.

Experimental Study of the Reactivity of Different Varieties of Carbon Towards Steam and Carbon Dioxide

The experimental methods devised in the laboratories of the Compagnie Générale de Construction de Fours for the study of the reactivity of coke were described by H. Cassan.

New expressions for the evaluation of coke reactivity are developed and are based on the ratio of the actual heat absorbed in the reaction between carbon and steam or carbon dioxide and the heat which would have been absorbed had reaction been complete. The heat items are calculated from the analysis of the gas obtained when a known weight of steam or a known volume of carbon dioxide is passed over hot carbon.

When one molecule of water vapour is brought in contact with an excess of carbon, the reaction is:

$$\mu\,C + H_2O = \nu\,C + \pi\,H_2O + \alpha\,CO_2 + \beta\,CO + \gamma\,H_2 - X \text{ kilo calories.}$$

For complete decomposition of the water vapour with formation of $CO + H_2$, the heat of reaction would be $-31{\cdot}18$ kilo calories. Hence the reactivity of coke towards water vapour may be expressed as $\frac{100\,X}{31{\cdot}18}$.

It may be shown that $X = 57{\cdot}8\,(1 - \pi) - 94{\cdot}24\,\alpha - 26{\cdot}62\,\beta$.

The reactivity towards water vapour then becomes $185 - 185\,\pi - 302\,\alpha - 85\,\beta$. Since, however, $\pi = 1 - 2\,\alpha - \beta$, the expression for reactivity may be simplified to $68\,\alpha + \beta$.

Similarly, in the case of reactivity towards carbon dioxide, we have:

$$\mu^1\,C + CO_2 = \nu^1\,C + \pi^1\,CO_2 + \alpha^1\,CO - X^1 \text{ kilo calories,}$$

whereas for complete decomposition of the carbon dioxide the reaction heat would be -41 kilo calories. Hence the reactivity of the coke towards carbon dioxide may be expressed as $\frac{100\,X^1}{41}$.

A very elaborate apparatus was designed for the determination of coke reactivity and determinations on various types of carbon were carried out. In particular, the experiments provided an explanation of the poor results which were obtained with a certain type of coke in a water gas generator.

A primary consideration in the design of the apparatus was to enable tests to be carried out on the coke (20 grammes) obtained in a carbonization assay test. Hence, to ensure that the coke would undergo as little change as possible during the reactivity test, no more than 1 gramme of carbon should be gasified, necessitating the decomposition of only 1·5 grammes of steam in a period of, say, 4 hours. The essential problem, therefore, was to provide a regular and continuous supply of water vapour at the rate of 0·375 gramme per hour. This was realized by use of the principle that application of heat at a steady rate to a dilatometer filled with water causes the expulsion of water at a definite rate. Thus, with a glass dilatometer having a capacity of 250 c.c. of water of which the coefficient of expansion is 0·0002 between 15° and 25° C., a regular rise of temperature of 1° C. per hour provides 0·05 c.c. of water per hour. The desired rate is therefore obtained with a temperature rise of 7·5° C. per hour, equivalent to 1,875 calories, or 2·47 watts per hour. A suitable electrically heated dilatometer was devised and was housed in an insulated box.

The next consideration was the provision of means for the evaporation of the water expelled from the dilatometer. To this end, a 27·5 centimetre length of platinum capillary tube with an external diameter of 0·6 mm. and a bore of 0·15 mm. was sealed to the exit from the dilatometer. The initial portion of the capillary was water jacketed, a length of 15 centimetres being heated with a current of 5 amps. at 8 volts, whereby the water was instantaneously evaporated. The steam was then carried in a current of nitrogen to an electrically heated superheater and thence over the coke which was contained in a transparent silica tube in an electrically heated furnace. Connection to the reaction tube was made by means of a seal of molten tin.

For an experiment, the coke (grain size 2-1 mm.) is heated to a temperature of 1,250° C. in a measured stream of nitrogen. Admission of steam to the nitrogen is then commenced, and the gas evolved over temperature intervals of 100° C., while the coke is slowly cooling to 700° C., is collected in a series of pipettes each preceded by a weighed calcium chloride tube. The increase in weight of the calcium chloride tubes due to absorption of undecomposed steam is determined at the end of the test and the samples of collected gas are analyzed. Data for the calculation of the reactivity of the coke at a series of temperatures are then available.

When determinations of reactivity towards carbon dioxide are carried out, use is also made of a falling temperature schedule, a mixture of carbon dioxide and nitrogen being passed over the coke. The apparatus is then simplified by elimination of the dilatometer, vaporizer, and superheater and the calcium chloride tubes.

Values of 70%, 60%, and 13% were found respectively for the reactivities of wood charcoal, gas coke, and graphite towards steam at 900° C. The gas coke in question was one which had given good results in a water gas generator. With a series of commercial cokes, values ranging between 15% and 85% at 950° C. were found. The coke which gave the value of 15% had, in fact, been found in practice to be quite incapable of yielding good results in water gas plant. Values of 45% and 62% found at 950° C. for samples of coke made from Boldon and Ruhr coals of similar characteristics under identical carbonizing conditions were in agreement with the fact that the latter coke gave better results in the manufacture of water gas, though the two cokes were apparently similar in all other respects.

Tests on the Purification of Gas by Catalytic Oxidation of the Sulphuretted Hydrogen

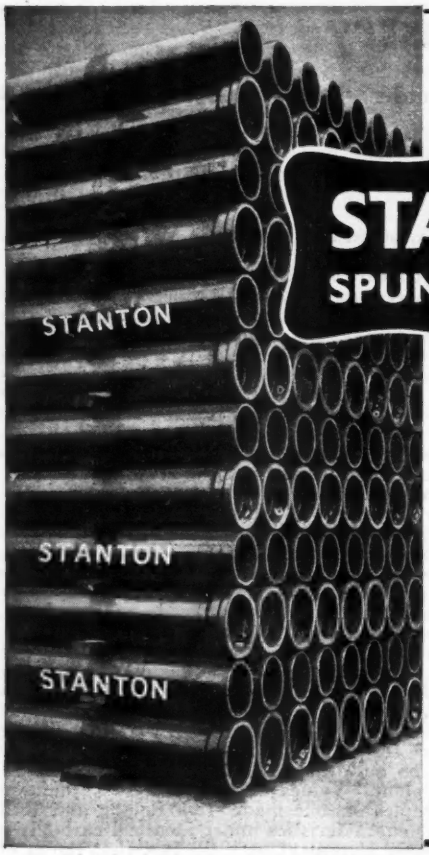
A. Nissiat described small scale tests carried out at Lyon-la-Mouche on the purification of producer gas by oxidation of the sulphuretted hydrogen with air through the agency of activated carbon impregnated with iron oxide by a patented process of the Société Carbonisation et Charbons Actifs.

The producer gas, made in Marischka producers either from coke breeze or anthracite, contained 53-70 grains of H_2S/100 cu.ft. The object of the treatment was to provide a gas suitable for the dilution of coal gas.

The physical nature of the active carbon is an important factor. The carbon employed was in the form of granulated threads. Its bulk density, when compacted to the maximum extent, was 28 lb./cu.ft., the particles of carbon having an apparent specific gravity of 0·65-0·70 and a porosity of 67%. The porosity was constituted as to rather more than one-half by pores effective in the recovery of organic vapours from saturated air and as to one-quarter by fine pores serving to adsorb vapours present in very low concentrations. After impregnation, the structure of the ferric oxide is modified so as to decrease its sensitiveness to poisoning.

Initially, the gas, together with a slight excess of air over that theoretically required to oxidize the sulphuretted hydrogen to sulphur, was passed through a tower containing a single layer of catalyst. Subsequently, a three-tier arrangement was adopted, the gas entering at the bottom of the tower. Each tier comprised a cooling section provided with a coil through which water could be circulated and a purifying section filled with catalyst. The tower had a diameter of approximately 10 in., the height of each layer of catalyst being about 6¼ in. Each catalyst space thus had a volume of 0·28 cu.ft. Provision was made for the addition of controlled amounts of air to each section.

It was found that condensation of water on the catalyst occurred and that this impaired the efficiency of the latter. Hence it was necessary to cool to 10° C. the gas which was initially saturated at 40° C. though it had been freed from



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Stanton Spun Iron Pipes are now not only stronger and better than pipes made by any other process, but they are also a considerable improvement over pipes previously cast by us in metal moulds without the use of the ferro-silicon process.

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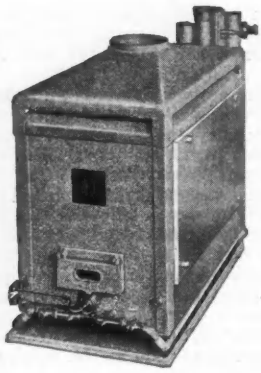

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dust and from most of its content of tar. Still further improvement was secured (1) by the inclusion, between the cooling and catalyst spaces, of sections filled with Raschig rings to eliminate the water mist and (2) by the thermal insulation of the tower.

In the single-tier apparatus the optimum rate of passage of the gas was found to be about 140 cu.ft. per hour corresponding to a contact time of about 7½ seconds.

In the three-tier apparatus in which the gas was treated at rates varying between 420 and 210 cu.ft./hour, the degree of elimination of sulphuretted hydrogen fell from an initial value of 98% to 91% after 10,000 cu.ft. of gas had been treated. Periodically, the catalyst was reconditioned by removal of the condensed water by passage of steam through the cooling coil. In all, 70,000 cu.ft. of gas were treated before it was judged necessary to remove the bottom tier of catalyst for regeneration, the best method for which was found to be treatment with superheated steam at a temperature of 400-450° C. The sulphur taken up by the catalyst was thereby eliminated and the activity of the catalyst was restored to 82% of its initial value. The sulphur does not separate readily from the aqueous condensate and, if coagulated, gives a discoloured product due to the presence of tar. A cleaner product was obtained from the second and third tiers.

Sulphur concentrations realized in the successive tiers of catalyst were 25%, 10%, and 3% respectively.

Whereas producer gas could be treated in presence of an excess of only 10% of air above the theoretical value, a 30-40% excess was necessary in the case of coal gas containing 220-310 grains of H_2S/100 cu.ft. and the process is apparently more delicate. Apparently some loss of calorific value occurs due to partial combustion of the carbon monoxide and methane.

Further Notes on the Investigation of Gas Heating Appliances

C. Deschamps developed further the principles outlined by him in a paper presented to the 1935 Congress [see "JOURNAL," 1935, 211, 425]. In conjunction with the testing of heating appliances, it is suggested that curves in which such characteristics as efficiency, carbon dioxide content of the waste gas, temperature of the exit gas, and draught are plotted for different heat inputs against the weight of air supplied per B.Th.U. of gas burnt are more readily interpreted than are curves based on other methods. The use of such graphs is illustrated by reference to two simple types of heaters provided with different types of flues and/or down-draught bafflers, and conclusions as to the performance of the appliances under different conditions of installation are drawn. Among points considered is the provision of an adequate supply of air to ensure the absence of condensates.

Trade Notes

Moulded Bakelite and Kitchen Architecture.

The multifarious applications of moulded bakelite are too well known for us to draw attention to them. In many ways bakelite mouldings can enhance the architecture of the modern kitchen. Pictorial examples of the ways in which this can be done are to be found in recent folders published by Evered & Co., Ltd., Surrey Works, Smethwick.

"Keith" and "E.K." Fans.

Fans in which the "Keith" multivane impeller is fitted are now obtainable in two distinct types—namely, the original "Keith" fan and a later development, the "E.K." fan. Both types are made by Keith Blackman, Ltd., 27, Farringdon Avenue, E.C. 4, and the distinguishing difference between them is that whereas the "Keith" fan has an outlet which is about three-fourths of the area of the inlet, the "E.K." has the outlet enlarged to practically the same area as the inlet. For any specified volume, therefore, the "E.K." fan has about three-quarters of the discharge velocity of the same nominal size of "Keith" fan, thus rendering it particularly suitable for the wide range of modern applications in which quietness of operation is essential. The enlarged discharge of the "E.K." fan has been obtained without any sacrifice of manometric efficiency so that, while the total heads of "Keith" and "E.K." fans of the same size are identical for the same speed and volume, the proportion of static pressure at the discharge is much higher in the case of the "E.K." type. The total efficiencies of both these types, which are fully dealt with in a recent publication by Keith Blackman, Ltd., are also practically identical.

(*Further Trade Notes on page* 1011.)

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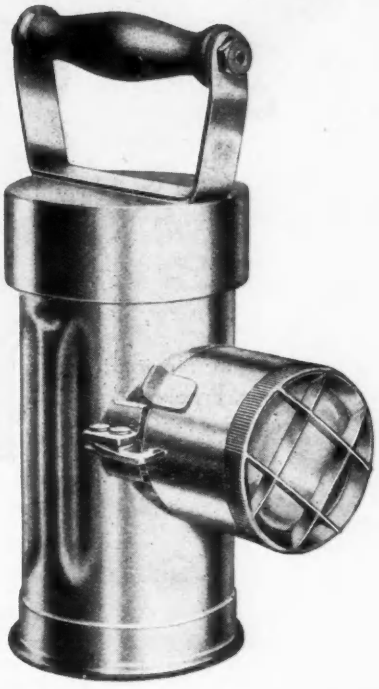

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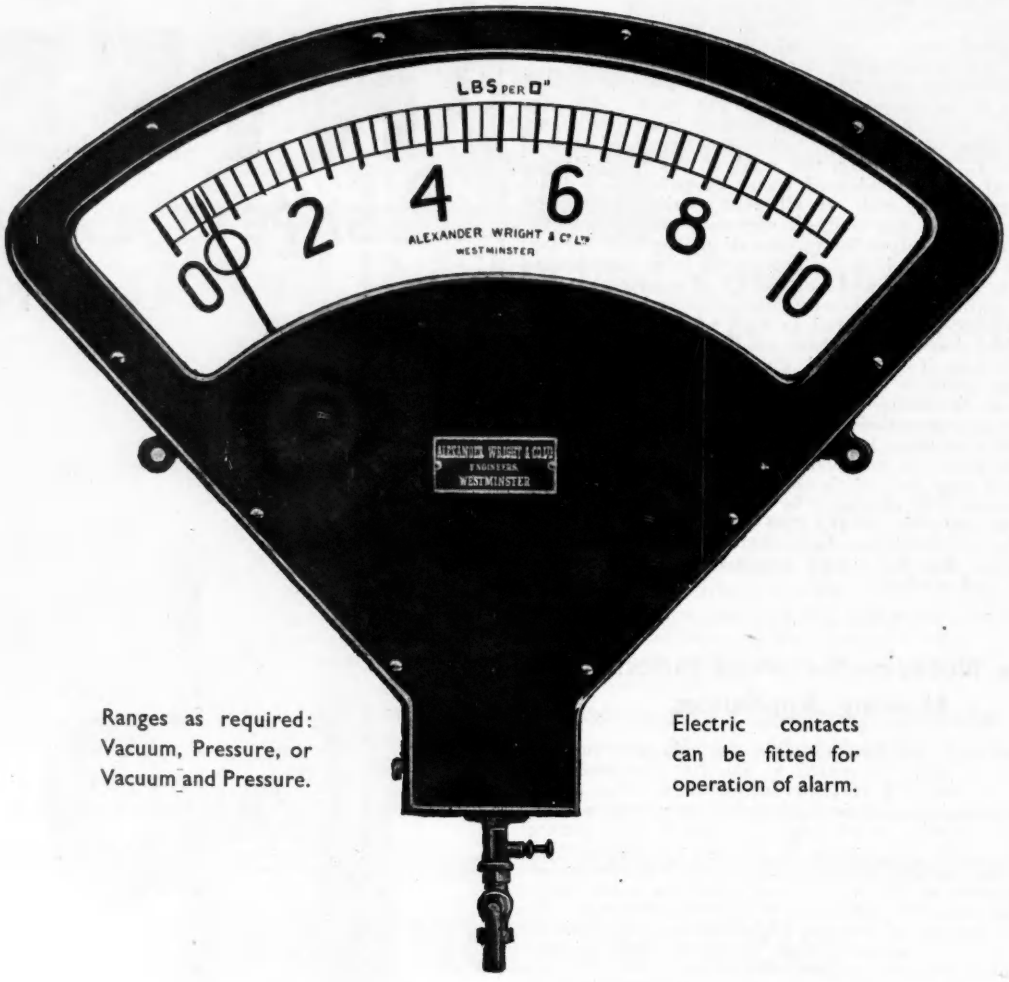

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THE "TWENTY-INCH SCALE"

Simmance Patent

DEAD-BEAT INDICATOR

The Indicator illustrated was supplied for measuring high-pressure gas supply sent out from Coke Ovens. Others are being used as a "Master Gauge" measuring district pressure to a large residential area in London district. In another application the Indicator has a double scale, internally illuminated, for observation from inside and outside a building.

ALEXANDER WRIGHT & Co., LTD., WESTMINSTER

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Business was on the quiet side last week, a not unusual circumstance for the few days preceding the Christmas holidays, though values generally were well maintained. A satisfactory feature was the report from many quarters that at last buyers were outnumbering sellers and the nervousness so apparent during the past few months was slowly but surely giving way to a more optimistic outlook. The general opinion is that given a cessation of serious political and financial disturbances abroad the outlook for the New Year is very promising.

There were no special features in the Gas market and with the exception of Alliance and Dublin ordinary, which lost 3 points to 160½, prices closed unchanged. It must be admitted, however, that there was a general tendency for prices to weaken. For example, Gas Light units in which a considerable number of dealings was reported went no better than 25s. 1½d. against the previous week's highest of 25s. 6d., though the quotation closed unchanged, and several other stocks fared in the same way.

The coming year will doubtless be a difficult one for many gas undertakings by reason of the increased costs of labour and raw materials, and already in some quarters small justifiable increases to the consumer have been notified. As in the past, however, a large proportion of this heavier expenditure will be met by economies effected by good management and should ensure in the majority of cases the maintenance of the usual rates of dividend.

Current Sales of Gas Products

The London Market for Tar Products.

Dec. 24.

The London Tar Products market is quiet, prices ruling at about the following figures:

Pitch, 38s. per ton f.o.b.

Creosote, 5⅞d. to 6d.

Refined tar, 3¾d.

Pure toluole, about 2s. 4d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, 1s. 7d. to 1s. 8d.; 90/160 pyridine, about 12s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Dec. 24.

The average prices of gas-works products during the week were: Gas-works tar, 25s. to 30s. Pitch—East Coast, 38s. to 40s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 38s. to 40s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅝d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 9d. to 4s. Naphthalene, £14 to £17. Salts, 80s. to 85s., bags included. Anthracene, "A" quality, 4¼d. to 4⅜d. per minimum 40% purely nominal; "B" quality unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Dec.* 25.

Owing to the holidays there is very little new business being arranged and prices show little or no alteration.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch remains steady at 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar is quiet with prices unchanged at 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil is fairly active at the following prices: Specification oil, 5¼d. to 5½d. per gallon; low gravity, 6¼d. to 6½d. per gallon; neutral oil, 5d. to 5¼d. per gallon, all *ex* works in bulk.

Cresylic acid is still distinctly dull with prices nominal as under: Pale, 97/99%, 3s. 3d. to 3s. 6d. per gallon; dark, 97/99%, 3s. to 3s. 3d. per gallon; and pale, 99/100%, 3s. 9d. to 4s. 3d. per gallon; all *ex* works in buyers' packages.

Crude naphtha continues to change hands at 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha, 1s. to 1s. 1d. per gallon.

Motor benzole is steady at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—Prices are nominal at 11s. to 12s. per gallon for 90/160 grade, and 12s. to 13s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 9½	to	0 10	per gallon at works
Motor ,, . . .	1 3	,,	1 3½	,, ,, ,,
90% ,, . . .	1 4	,,	1 4½	,, ,, ,,
Pure ,, . . .	1 8	,,	1 8½	,, ,, ,,

Contracts Advertised To-Day

Benzole Plant.

Perth Gas Department. [p. 1018.]

Dry Gas Plant.

Perth Gas Department. [p. 1018.]

Purifiers.

Tipton U.D.C. Gas Department. [p. 1018.]

Wrought Iron Tubing and Fittings.

Bradford Gas Department. [p. 1018.]

Further Trade Notes

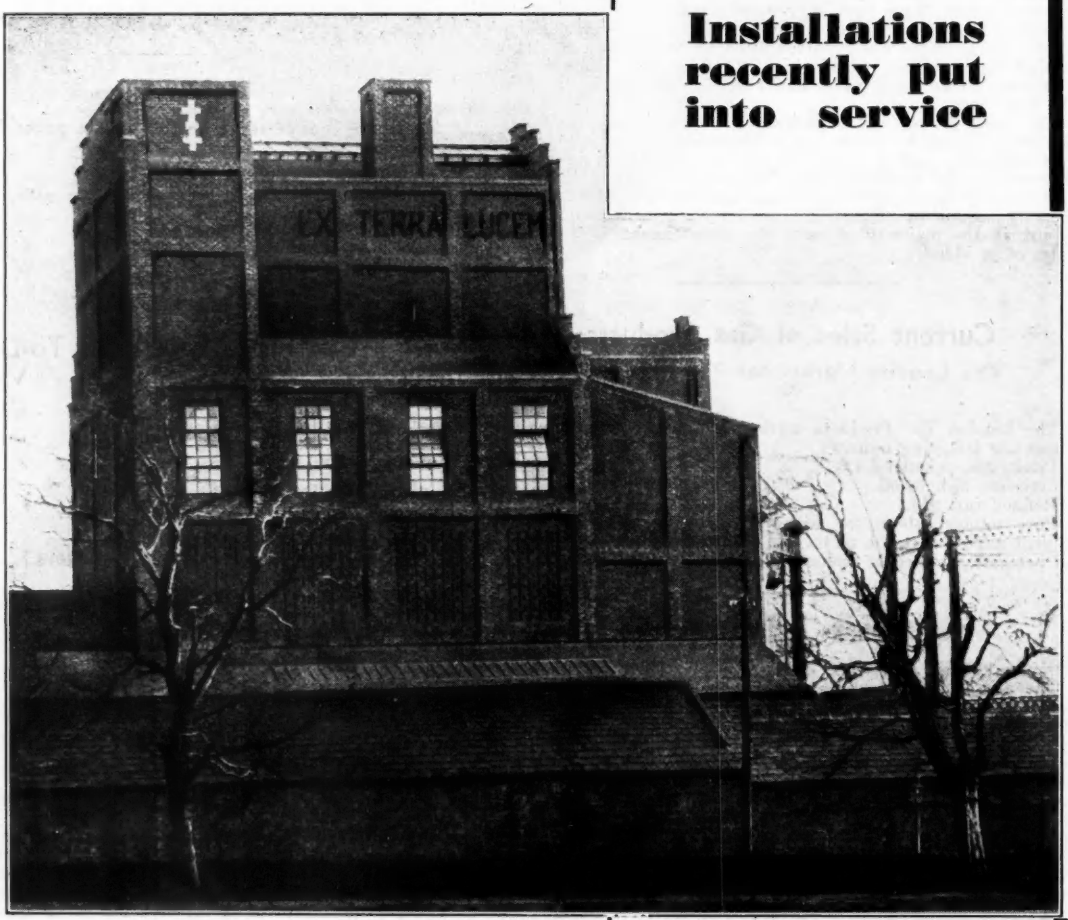
"Nolos" Slide Valve Steam Traps.

Details of the "Nolos" slide valve steam trap have been forwarded to us by Messrs. Hopkinsons, Ltd., Huddersfield, and 34, Norfolk Street, Strand, W.C. 2. The action is as follows. The inlet connection is at the top of the trap, and immediately below this is a cast-iron baffle plate which protects a ball float from the sudden impact of "sludge" of condensate, all condensate being directed down the sides of the trap body. This baffle plate acts as a collector for foreign material. An outlet connection is at the bottom of the body, the valve seating being held to the body by a companion flange and tee-headed bolts. The valve and seating are of the slide valve design, the valve being held against the seating by fluid pressure within the trap. As condensate enters the trap the float is raised. This action moves the lever carrying the valve head, thus opening the trap and discharging the condensate. This action goes on continuously so long as condensate is being produced in the system, and when condensate ceases to flow into the trap, the float gradually falls, finally shutting the valve cleanly without loss of steam. Bodies and covers of cast-iron are designed to withstand pressures up to 200 lb. per sq.in.; those in cast steel are suitable for higher pressures.

THE WEST SYSTEMS OF MODERN GAS AND COKE MANUFACTURE

GLOVER-WEST
VERTICAL RETORTS

Installations recently put into service



Carbonizing plants ordered or started up during 1937 bring the total installations of West design up to 416. The total of retorts or chambers involved is 10,732.

YEADON Continuous carbonization in Glover-West vertical retorts was adopted by the Yeadon and Guiseley Gas Company for their works modernization scheme of 1934. Smokeless operation was an important factor in the decision. The extension to this plant which began operation early in the present year has increased its production capacity by 50 per cent.

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING 'Phone: COLLYHURST 2961 : 'Grams: "STOKER, MANCHESTER"

LONDON: COLUMBIA HOUSE, ALDWYCH, W.C.2 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 21.	Rise or Fall on Week.	Transaction Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 6	8	8	Alliance & Dublin Ord. ...	158—163	−3	...
374,000	,,	Dec. 13	4	4	Do. 4 p.c. Deb. ...	93—98*	...	...
558,890	,,	Aug. 9	7	7	Barnet Ord. 7 p.c.	158—163	...	...
300,000	1	Oct. 4	1/9⅜	1/4½	Bombay, Ltd.	26/—28/-	...	27/1½—27/6
179,915	Stk.	Aug. 9	9½	9½	Bournemouth sliding scale ...	200—205	...	...
590,407	,,	,,	7	...	Do. 7 p.c. max. ...	158—163	...	161—161½
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...	...
50,000	,,	Dec. 13	...	3	Do. 3 p.c. Deb. ...	78—83*	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	115—120*	...	...
357,900	,,	Aug. 9	7½	7½	Brighton, &c., 6 p.c. Con. ...	150—155	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	133—138	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	127—133	...	...
855,000	,,	Sept. 20	8	7	British Ord.	139—144	...	139½—140
100,000	,,	Dec. 13	7	7	Do. 7 p.c. Pref.	140—145*	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115*	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100*	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107*	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1⅛—2⅛	...	...
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1⅛—3⅛	...	...
150,000	Stk.	Dec. 13	4½	4½	Do. 4½ p.c. Deb. ...	77—82*	...	...
626,860	,,	July 19	6	6	Cardiff Con. Ord.	125—130	...	...
237,860	,,	Dec. 13	5	5	Do. 5 p.c. Red. Deb.	106—111*	...	...
98,936	1	Oct. 4	2/-	2/-	Colombo Ord.	1⅞—1⅞	...	...
24,510	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	23/6—25/6	...	...
739,453	1	Oct. 4.	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	...
296,144	1	..	1/3·30	1/3·30	Do. 8 p.c. Pref	22/—24/-	...	...
1,775,005	Stk.	Aug. 9	5	5	Commercial Ord.	80—85	...	82
620,000	,,	Nov. 29	3	3	Do. 3 p.c. Deb. ...	73—78	...	75
286,344	,,	Aug. 23	5	5	Do. 5 p.c. Deb. ...	113—118	...	...
807,560	,,	Aug. 9	7	7	Croydon sliding scale ...	140—145	...	...
644,590	,,	,,	5	5	Do. max. div.	110—113	...	112
620,385	,,	Dec. 13	5	5	Do. 5 p.c. Deb.... ...	112—117*	...	...
239,000	,,	Aug. 9	5	5	East Hull Ord. 5 p.c.... ...	98—103	...	...
185,355	,,	Aug. 9	6	6	East Surrey Ord. 5 p.c. ...	120—125	...	...
176,211	,,	Dec. 13	5	5	Do. 5 p.c. Deb. ...	112—117*	...	...
250,000	1	Nov. 15	7	4	Gas Consolidation Ord. ...	19/6—21/6	...	...
250,000	1	,,	4	4	Do. 4 p.c. Red Cum. Pref.	18/6—20/6	...	...
19,255,284	Stk.	Aug. 9	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	24/6—25/6a	...	24/6—25/1½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.... ...	83—86	...	85
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref....	100—103	...	103
2,993,000	,,	July 5	...	3½	Do 3½ p.c. Red. Pref.	101—103	...	102⅜—102⅜
8,602,497	,,	Nov. 29	3	3	Do. 3 p.c. Con. Deb....	78—81*	...	79½—81
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb....	112—115	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	110—113	...	112½—112¾
700,000	,,	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb....	98—101	...	99½
270,466	,,	Aug. 23	6	6	Harrogate New Cons. ...	115—120	...	...
213,200	,,	Aug. 9	6	6	Hornsey Con. 3½ p.c. ...	118—123	...	...
5,600,000	,,	Nov. 1	12	8	Imperial Continental Cap. ...	135—140	...	136—137½
223,130	,,	July 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...	...
285,242	,,	Aug. 9	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...	...
75,000	,,	Nov. 29	†10	†10	Malta & Mediterranean ...	145—155	...	...
					Metropolitan (of Melbourne)			
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—103	...	...
231,978	Stk.	Aug. 23	5	5	M.S. Utility 'C' Cons. ...	101—106	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	96—101	...	...
360,075	,,	Dec. 13	4	4	Do. 4 p.c. Deb. ...	97—102*	...	...
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	112—117*	...	...
675,000	,,	Nov. 15	†9	†6	Montevideo, Ltd.	85—90	...	87
250,000	,,	Aug. 9	7½	7½	North Middlesex 6 p.c. Con.	147—152	...	...
396,160	,,	Aug. 9	5	5	Northampton 5 p.c. max. ...	110—115	...	...
300,000	,,	Oct. 18	†7	†9	Oriental, Ltd....	153—158	...	155½—157
468,537	,,	Dec. 13	8	8	Plymouth & Stonehouse 5 p.c.	154—159*	...	...
621,667	,,	Aug. 9	8¼	8¼	Portsmouth & Gosport Cons.	164—169	...	164½
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	106¼
73,350	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
441,275	1	Sept. 20	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	21/6—23/6	...	...
460,810	1	,,	-/10⅜	-/10⅜	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...	...
133,201	Stk.	Aug. 23	5	8½	Shrewsbury 5 p.c. Ord. ...	130—135	...	...
1,371,752	1	Sept. 6	1/2⅜	1/2⅜	South East'n Gas. Cn.Ld. Ord.	23.—25/-	...	23/9—24/3
871,636	1	,,	-/10⅜	-/10⅜	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	...
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/-—20/	...	...
450,000	Stk.	Aug 9	4	4	Do. 4 p.c. Deb.	99—102	...	...
150,000	..	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	...
6,709,895	..	Aug.	6	5	South Met. Ord.	101½—103¾	...	102—102½
1,135,812	..	..	6	6	Do. 6 p.c. Irred. Pf. ...	131—136	...	...
850,000	..	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	...	...
1,895,445	..	Dec. 13	3	3	Do. 3 p.c. Deb. ...	74—79*	...	77⅞
1,000,000	.	July 5	5	5	Do. 5 p.c. Red. Deb....	110—113	...	...
1,543,795	..	Aug. 9	6	6	South Suburban Ord. 5 p.c....	120—125	...	122
512,825	..	,,	5	5	Do. 5 p.c. Pref ...	110—115	...	...
500,000	..	,,	4	4	Do. 4 p.c. Pref....	95—100	...	...
250,000	..	,,	...	‡18/9	Do. 3½ p.c. Red. Pref.	98—101	...	...
888,587	..	Dec. 13	5	5	Do. 5 p.c. Deb....	113—118*	...	...
250,000	..	,,	4	4	Do. 4 p.c. Deb....	97—100*	...	...
200,000	..	Sept. 20	...	3½	Do. 3½ p.c. Red. Deb.	94—99	...	...
427,859	1	Nov. 1	1/2⅜	9⅜	S. Western Gas & Water Ord.	18 6—20 6	...	18/6
160,523	1	,,	-/10⅜	-/10⅜	Do. 4½ p.c. Red. Cum. Pf.	19.6—21/6	...	...
110,000	Stk.	Dec. 13	4	4	Do. 4 p.c. Red. Deb. ...	97—102*	...	...
750,541	,,	Aug. 9	5⅜	5	Southampton Ord. 5 p.c. ...	111—116	...	...
148,836	,,	Dec. 13	4	4	Do. 4 p.c. Deb.	96—101*	...	...
350,000	,,	Aug. 23	5⅛	5⅛	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
94,000	,,	June 7	3⅛	3⅛	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 9	6⅜	6⅜	Tottenham and District Ord.	132—137	...	...
409,835	,,	,,	5⅛	5⅛	Do. 5½ p.c. Pref....	121—126	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...	...
371,850	,,	Dec. 13	4	4	Do. 4 p.c. Deb. ...	97—102*	...	100
888,629	1	Oct. 4	6	4	U. Kingdom Gas Cor. Ord.	19.6—21.6	...	19/9
937,743	1	Nov. 15	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	20/6
745,263	1	Dec. 13	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf	16/6—18/6*	...	17/9
1,000,000	Stk.	Sept. 20	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	97½
373,939	,,	Aug. 9	7	7	Uxbridge, &c., 5 p.c. ...	138—143	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...	...
1,371,138	,,	Aug. 9	7	7	Wandsworth Consolidated ...	140—145	...	...
2,525,768	,,	,,	4	4	Do. 4 p.c. Pref. ...	99—102	...	...
1,343,964	,,	Dec. 13	5	5	Do. 5 p.c. Deb. ...	113—118*	...	...
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	...	...
558,342	,,	Aug. 9	7	7	Watford and St. Albans Ord.	140—145	...	142—143½
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...	...
200,000	,,	,,	5⅛	5⅛	Do. 5½ p.c. Pref. ...	121—126	...	...
200,000	,,	Nov. 29	4	4	Do. 4 p.c. Red. Deb.	95—100	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb.	94—99	...	...

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of income-tax. ‡ For year. ‡ Actual.

Stock and Share List continued overleaf.

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Dec. 17	Rise or Fall on Week.	Transactions. Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 19	6	5	Bath Cons.	120—122	...	...
1,667,250	,,	July 19	5	5	Bristol, 5 p.c. max.	116—117	...	...
120,420	,,	Dec. 13	4	4	Do. 1st 4 p.c. Deb. ...	99—101*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	99—101*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	118—121*	...	...
274,000	,,	July 19	5	5	Newport (Mon.) 5 p.c.max. ...	100—105	...	...
13,200	12	Sept. 6	8	7	Pontyp'l Gas & W. 10 p.c. 'A'	13—14	...	...
13,600	10	,,	6	5	Do. 7 p.c. 'B'	11⅞—12⅜	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C'	11⅞—12⅜	...	...
140,778	Stk.	Aug. 9	5	5	Weston-super-Mare Cons. ...	110—112	...	...
64,338	,,	June 21	4	4	Do. 4 p.c. Deb.	96—98	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	157—160	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug. 9	6½	5	Chester 5 p.c. Ord.	104—109	...	...
92,500	,,	Dec. 13	4	4	Do. 4 p.c. Pref.	96—100*	...	...
36,430	,,	,,	3½	3½	Do. 3½ p.c. Deb....	88—91*	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101*	...	...
2,167,410	,,	Aug. 23	6	6	Liverpool 5 p.c. Ord. ...	125½—127½	...	...
245,500	,,	Dec. 13	5	5	Do. 5 p.c. Red. Pref. ...	99—104*	...	...
306,083	,,	July 1	4	4	Do. 4 p.c. Deb. ...	102—104	...	...
106,280	,,	Aug. 9	10	10	Preston 'A' 10 p.c.	206—216	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	147—157	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Aug. 9	8	8	Blyth 5 p.c. Ord.	165—166	...	...
732,000	,,	Aug. 9	5	5	Hartlepool G. & W. Cn. & New	112—114	...	...
2,061,315	,,	Aug. 9	5½	5	Newcastle & Gateshead Con.	23/3—23/9a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	98—100	...	...
776,706	,,	June 21	3½	3½	Do. 3½ p.c. Deb. ...	90½—91½	...	...
277,285	,,	Nov. 1	5	5	Do. 5 p.c. Deb. '43...	103—105	...	...
332,351	,,	Aug. 23	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 9	9	6	Derby Con.	135—145	...	...
55,000	,,	Dec. 13	4	4	Do. 4 p.c. Deb.	100—105*	...	...
20,000	10	Dec. 13	5	5	Long Eaton 5 p.c. Pref. ...	10—12*	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110*	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Sept. 20	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Aug. 23	6	6½	Sheffield Cons.	144—148	...	...
95,000	,,	July 5	4	4	Do. 4 p.c. Deb.	100—103	...	...
Supplementary List of Stocks and Shares not Officially Quoted								
202,152	Stk.	Sept. 6	25/-b	5	Ascot Ord.	100—105	...	...
128,182	,,	Dec. 13	5	5	Do. 5 p.c. Pref.	108—113*	...	...
573,156	1	Nov. 15	5	5	Assd. Gas and Water Ord. ...	19/—21/-	...	...
167,506	1	,,	...	-/4c	Do. 4 p.c. Red. Cum. Pref.	19/—20/-	...	20/-
253,118	1	,,	...	4	Do. 4 p.c. Irred Pref. ...	18/—20 -	...	...
500,000	1	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-	...	...
500,000	Stk.	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	95—96
31,035	1	Aug. 23	...	-/4½	Associated Utilities 4 p.c. Pref.	16/6—18/6	...	...
100,000	Stk.	Dec. 13	...	3½	Do. 3½ p.c. Red. Deb.	95—100*	...	...
17,000	,,	Aug. 23	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	141—146	...	...
37,440	,,	Aug. 9	10	10	Cam. Univ. & Town 10 p.c.max.	193—203	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	135—140	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Aug. 9	8½	7½	Eastbourne 'A' 5 p.c. ...	158—163	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	128—133	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
130,000	,,	Dec. 13	5	5	Do. 5 p.c. Deb.	113—118*	...	...
24,000	30	Aug. 23	8½	8½	Great Yarmouth 8½ p.c. max.	44—49	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	34—39	...	...
51,160	Stk.	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125*	...	...
152,600	,,	Sept. 6	9	8	Guildford Cons.	170—175½	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
68,250	,,	Dec. 13	5	5	Do. 5 p.c. Deb.	112—117*	...	...
156,600	,,	Aug. 23	7½	7½	Hampton Court Cons. ...	158—163	...	...
73,620	,,	Sept. 6	8½	8½	Luton Cons. 'A'	163—168	...	...
107,960	10	Sept. 20	5½	4	Mid Kent Ord.	8¾—9¾	...	...
230,940	Stk.	Aug. 9	10	10	Oxford & District Ord. ...	205—210	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	110—115	...	...
126,193	,,	Nov. 15	7½	7½	Peterborough Ord.	158—163	...	...
64,990	,,	Sept. 6	7½	6¼	Redditch Ord.	125—135	...	...
166,850	,,	Aug. 9	8	8	Romford Ord.	155—160	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 20	5	5	Do. 5 p.c. Deb.	113—118	...	...
25,570	,,	Aug. 9	5½	5½	Rugby 5½ p.c. Pref.	125—130	...	...
25,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...	...
42,750	,,	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125*	...	...
10,950	,,	Aug. 23	8	8	Ryde Ord.	158—163	...	...
270,086	,,	Sept. 6	7	7	Slough Ord.	135—140	...	...
21,000	,,	Dec. 13	5	5	Do. 5 p.c. Deb.... ...	110—115*	...	...
28,872	1	Nov. 1	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...	...
28,866	1	Sept. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Aug. 9	7	7	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Aug. 23	5	5	Swindon Cons.	106—111	...	...
60,425	,,	Dec. 13	5	5	Do .5 p.c. Deb.	110—115*	...	...
64,380	,,	Dec. 13	5	5	Torquay and Paignton 5 p.c. Pf	108—113*	...	...
500,000	1	Nov. 15	...	-1·15c	United Kingdom Gas Corpn. 4 p.c. 1st Red. Cum. Pref.	19/—21/-	...	20/-
33,858	1	,,	...	-/2·70c	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	20/—20/6
130,000	Stk.	Aug. 9	8	5	Wakefield Ord.	120—125	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Aug.	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Aug. 9	6	6	Wolverhampton 6 p.c. Pref....	120—125	...	...
160,000	,,	Dec. 13	5½	5½	Do. 5½ p.c. Rd. Db	107—112*	...	...
90,000	,,	Dec. 13	5	5	York 5 p.c. Red. Deb. ...	104—109*	...	...
133,640	,,	July 19	6½	6½	Yorktown (Cam.) 5 p.c Cons.	128—133	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
35,000	,,	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	121—126*	...	...

a The quotation is per £1 of Stock. b Actual for Quarter. c Actual. * Ex div.

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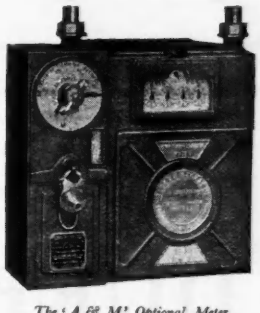

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APPOINTMENTS, &c., VACANT.

APPLICANTS for the Position of TECHNICAL ASSISTANT & DRAUGHTSMAN to the Weymouth Consumers Gas Company are THANKED, and notified that an APPOINTMENT HAS NOW BEEN MADE.

PADIHAM URBAN DISTRICT COUNCIL.

APPOINTMENT OF GAS ENGINEER.

THE above Council invite Applications for the Position of ENGINEER AND MANAGER of their Gas Undertaking at a Salary of £400 per Annum, increasing, subject to satisfactory service, by annual increments of £25 to £450 per Annum.

The person appointed will be required to accept a transfer of Articles of Apprenticeship of one pupil for the unexpired period of a term of three years ending on 9th November, 1939, and in respect of which an additional Salary of £35 per Annum will be paid by the Council during such period.

The appointment will be subject to three months' notice on either side, and the person appointed will be required to reside within the Urban District.

Applications, stating Age and giving particulars of Training and Experience, and accompanied by *copies* of Two recent Testimonials, must be delivered to the undersigned not later than 11th January, 1938.

P. WILLIAMS,
Clerk to the Council.

Council Offices,
Padiham,
Dec. 18, 1937.

COUNTY BOROUGH OF BURNLEY.

(GAS DEPARTMENT.)

APPLICATIONS are invited for the Position of ENGINEERING ASSISTANT to the Burnley Corporation Gas Undertaking, at a Salary, in accordance with Grade D.1 of the Corporation's Grading Scheme, commencing at £248 7s. 10d. per Annum, and rising, subject to satisfactory service, by eight annual increments to £342 12s. 2d. per Annum, such salary to vary in accordance with the cost of living figure.

Applicants must have a good general engineering knowledge of Modern Gas-Works Practice, and be capable of exercising the necessary Technical Control of the Works. Full particulars of Experience with Horizontal Retorts and Machinery, Carburetted Water Gas, Tar Distillation, and Crude Benzole Plant should be stated.

Applications, stating Age and giving full particulars of present Appointment, Qualifications, and Experience, accompanied by *copies* of Three recent Testimonials, and endorsed "Engineering Assistant," should be received by the undersigned not later than Saturday, the 15th January, 1938.

Canvassing, directly or indirectly, will be a disqualification.

HARRY PLOWMAN,
Town Clerk.

Town Hall,
Burnley,
Dec. 21, 1937.

CONTRACTS OPEN.

CITY OF LINCOLN.

(GAS DEPARTMENT.)

TENDERS are required for the Supply, Delivery, and Erection complete of approximately 806 Yards of 95 Lbs. per Yard B.H.B.S. RAILS for Railway Siding, including Turnouts, Angle and Slip Diamonds, Buffer Stops, Fishplates, Chairs, Sleepers, Switches, &c., at the Bracebridge Gas-Works, Lincoln.

Full Particulars and Drawings may be obtained from the undersigned.

Tenders, in plain sealed envelopes, to be sent to G. H. Banwell, Esq., Town Clerk, Lincoln, not later than Twelve noon Friday, January 7th, 1938, marked "Tender for Sidings."

The lowest or any Tender not necessarily to be accepted.

GEO. WRIGHT,
City Gas Engineer and Manager.

Dec. 20, 1937.

PERTH CORPORATION.

(GAS DEPARTMENT.)

BENZOLE AND DRY GAS PLANTS.

THE Corporation invite Tenders for the Installation of a CRUDE BENZOLE EXTRACTION and RECOVERY PLANT and a DRY GAS PLANT at their Gas-Works.

Specifications and Particulars can be had from the Engineer and Manager, Gas-Works, Perth.

Tenders, endorsed "Benzole Plant" and/or "Dry Gas Plant," should be sent to the Town Clerk, City Chambers, Perth, not later than 14th January, 1938.

(Signed) A. C. REA,
Engineer and Manager.

Gas-Works,
Friarton,
Perth,
Dec. 21, 1937.

CITY OF BRADFORD.

TENDERS FOR WROUGHT IRON TUBING AND FITTINGS.

THE Gas Committee of the Bradford Corporation are prepared to receive TENDERS for the Supply and Delivery of GENUINE PUDDLED IRON TUBING AND FITTINGS (Steam and Gas) required in their several Departments during the Nine Months ending 30th September, 1938.

Forms of Tender, with any further information required, may be had on application to the Gas Engineer, Britannia House, Bradford.

No Tender will be received unless enclosed in a plain sealed envelope bearing the words "Tender for Wrought Iron Tubing—Gas Department," but not bearing any name or mark indicating the sender.

The Contract will be let subject to the Fair Contracts Clauses of the Corporation.

Tenders are to be sent so as to reach me not later than Nine a.m. on Monday, 10th January, 1938.

The lowest or any Tender will not necessarily be accepted.

N. L. FLEMING,
Town Clerk.

Town Hall,
Bradford,
December, 1937.

CONTRACTS OPEN. (*Continued.*)

TIPTON URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

PURIFIERS.

TENDERS are invited for the Supply and Erection of an Installation of PURIFIERS.

Specifications and Drawings, &c., may be obtained by *bona-fide* Contractors from the undersigned.

Tenders, in plain sealed envelopes, bearing no mark to indicate the sender, must be lodged with the Clerk of the Council, Municipal Buildings, Sedgley Road West, Tipton, not later than first post Monday, 24th January, 1938.

The Council do not bind themselves to accept the lowest or any Tender.

W. WILLIAMS,
Engineer and Manager.

Gas-Works,
Alexandra Road,
Tipton, Staffs.,
Dec. 24, 1937.

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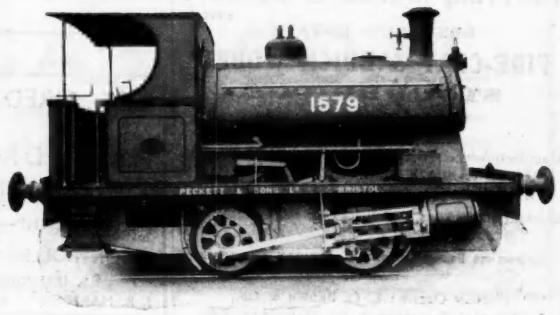

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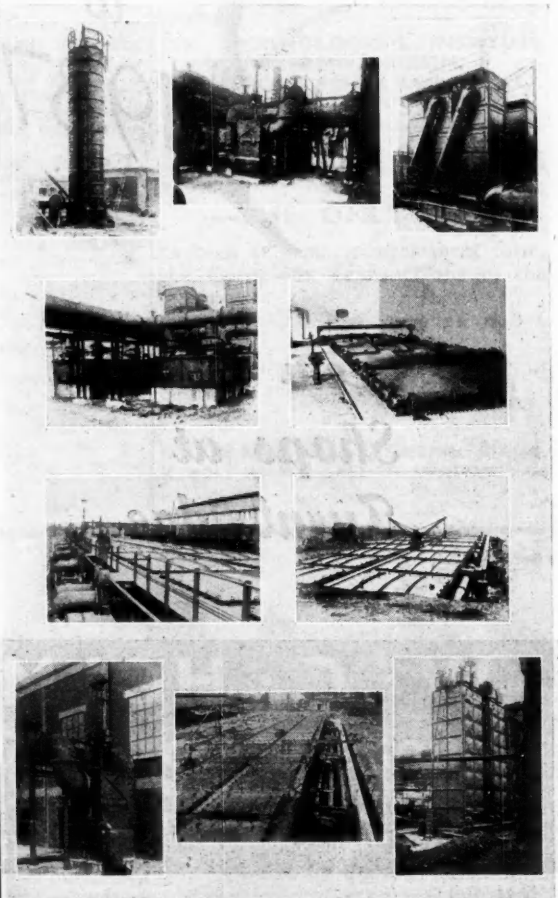

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